Guideline for Obstetric Ultrasound

University Hospitals of Leicester NHS Trust

Trust ref: B52/2011

1. Introduction and who the guideline applies to:

This guideline has been produced as a joint collaboration between the Clinical Supporting and Imaging (CSI) Clinical Management Group (CMG) and Women's and Children's CMG and applies to both CMGs.
It replaces Ultrasound Guideline for Obstetrics (B52/2011) (2008)

2. Related UHL guidelines and policies:

Booking process (including late bookers) and risk assessment in pregnancy and the postnatal period	C16/2011
Missed Antenatal appointments Management Guideline	C81/2005
Policy for the decontamination of ultrasound probes within Imaging	B34/2016
SOP diagnostic ultrasound examinations	SOP/704
Policy for ViewPoint Downtime	B52/2019
Down's, Patau's and Edwards' Syndrome (Trisomies) Screening Guideline	C6/2001
Referral when a fetal abnormality is detected in the antenatal period	C87/2005
Management of Miscarriage	C30/2013
Antenatal Management of Multiple Pregnancy	C14/2011
Reduced fetal movements – Guidelines for assessment of risk and management	C70/2004
Fetal Surveillance – Risk assessment, Investigation and Management of Small for Gestational Age Fetus	C38/2017
Placenta praevia and Placenta Accreta – Diagnosis and management	C6/2014

Contents

Abbreviations

AC	Abdominal Circumference

AFI	Amniotic Fluid Index
AP	Anterior posterior
CASE	Consortium for the Accreditation of Sonographic Education
CGC	Customised Growth Chart
CMV	Cytomegalovirus
CRL	Crown Rump Length
DCDA	Dichorionic diamniotic
DQASS	Down's Quality Assurance Support Service
DVP	Deepest Vertical Pool
EDD	Estimated Due date
EDF	End Diastolic Flow
EFW	Estimated Fetal Weight
e-lfH	E-learning for Health
FASP	Fetal Anomaly Screening Programme
FL	Femur Length
FM	Fetal Medicine
GAU	Gynae assessment Unit
GROW	Gestation Related Optimal Weight
GTT	Glucose tolerance test
HC	Head Circumference
KPI	Key performance Indicator
MAU	Maternity Assessment Unit
MCDA	Monochorionic diamniotic
MCMA	Monochorionic monoamniotic
MSD	Mean Sac Diameter
NCARDRS	National Congenital Anomaly and Rare Diseases Registration
NIPT	Non Invasive Prenatal Testing
NT	Nuchal Translucency
PAPP-A	Pregnancy associated plasma protein A
SFH	Symphysis Fundal Height
SGA	Small for Gestational Age
SSS	Screening Support Sonographer
T13	Trisomy 13- Patau's Syndrome

T18	Trisomy 18 – Edwards' syndrome
T21	Trisomy 21 – Down's Syndrome
TA	Transabdominal
Toxo	Toxoplasmosis
TV	Transvaginal

Qualifications and training

There is a designated lead for antenatal screening for the UHL Maternity Service, whose role it is to ensure processes are in place to offer women appropriate ultrasound-based screening tests in pregnancy as per Fetal Anomaly Screening Programme (FASP) Guidelines.

Staff performing obstetric ultrasound (US) scans will normally hold a recognised ultrasound qualification such as the Diploma in Medical Ultrasound, Post-graduate CASE Accredited Qualification in Obstetric ultrasound, RCOG Intermediate scan module in normal fetal anatomy or RCOG Advanced Training Skills Training Module in high risk pregnancy for growth scans or fetal medicine for anomaly scans.
Some Consultant obstetricians will perform Obstetric Ultrasound without a formal qualification as listed above. These clinicians will have had outline ultrasound training as Registrars. Further one to one clinical training will then be delivered by consultants with a recognised ultrasound qualification and/or a fetal medicine Consultant
All staff performing obstetric ultrasound scans will be referred to as ultrasound practitioners throughout this document.

Online training

The following FASP e-learning modules are mandatory requirements. They are available on the e-LfH website

All those participating in the Combined screening programme for Down's, Edwards' and Patau's Syndromes must complete the following resources:

- **Screening for Down`s, Edwards` and Patau`s syndromes** every 24 months.
- **First trimester screening resource for sonographers** every 12 months.

All those participating in the 18^{+0} to 20^{+6} week fetal anomaly screening programme must complete:

- **Fetal cardiac e-learning** every 24 months.
- **18^{+0} to 20^{+6} week fetal anomaly ultrasound scan** every 24 months.

Confidentiality, communication and consent

Before starting any scan, reports regarding the previous woman must be completed and the examination ended on the ultrasound screen.

Identification details must be checked before the start of the examination.

A clear explanation of the examination procedure should be given, and the woman must give their consent before the examination begins.

If the ultrasound practitioner feels that there is insufficient understanding of the test due to a language barrier, then the telephone translation service should be used to gain consent and exchange relevant information.

If during the scan the ultrasound practitioner has concerns regarding any Safeguarding issues they must escalate to the antenatal clinic midwives for advice and assistance regarding further investigation and onward referral to the Safeguarding midwife. Any undisclosed Female Genital Mutilation should be reported in line with trust policy.

During or at the end of the scan, the woman and accompanying persons will be shown the broadly relevant features of the fetus.

If parents wish to know the sex of their baby, this may be done during the anomaly scan.

Parents should be informed this is not guaranteed to be accurate and if the ultrasound practitioner is unable to determine gender the examination will not be extended or repeated for this purpose.

This opinion will only be given verbally and will not be written down. Fetal sex will not be documented unless this is for clinical purposes.

Infection control

All staff are responsible for following local and trust infection control guidelines.

The Policy for the Decontamination of Ultrasound Probes within Imaging must be followed.

Admittance to the scan room

One accompanying adult may be admitted into the scan room.
In exceptional circumstances the woman's own children may be admitted at the ultrasound practitioner's discretion. The woman should telephone the USS department to make arrangements in advance. We are not able to supervise children left in the waiting area.
Any child causing a distraction detrimental to the examination will be asked to leave the scan room with a responsible adult. If there is no adult with the child, the examination will need to be rebooked and the woman advised to make alternative arrangements for her child.

If a male sonographer is declined and it is not possible to accommodate with a female sonographer then that specific scan will not be rebooked due to the high number of scans that are needed and a note will be placed on next appointment that a female sonographer is preferred but not guaranteed. The woman should be informed of this, and advised to talk to her partner prior to attending her next scan.

If the woman arrives more than 10 minutes late for her appointment and there may be insufficient time to perform the scan then the appointment will be rebooked at the sonographers' discretion.
The woman's agreement must be sought if it is necessary for another adult to be present during the scan such as:

- Interpreters
- Chaperones
- Trainee/students

Digital recording/filming of the examination is not permitted by women or their partners

Maintenance and care of the ultrasound equipment

The ultrasound machine should be checked by the ultrasound practitioner to ensure there is no damage to the probes, cabling or console.

Ultrasound machines are tested every six months for calibration and safety by the medical physics department.

Any faults identified when the equipment is being used must be reported by the operator to Althea or Imagex via medical physics.

In the event that the equipment fault poses a significant safety risk, the equipment must be shut down until the fault is repaired.

Ultrasound technique

Optimised and magnified images should be obtained using the machine controls and correct probe selection.

The power should be reduced to give a Mechanical Index of < 1.0 in line with the As Low As Reasonably Practicable principle.

If fetal heart movements are demonstrated - the mother should be informed and shown the fetus with the heartbeat.

It should be explained that certain measurements need to be carried out and these require complete concentration.

Reporting and image storage

Electronic copies of the examination images will be saved in ViewPoint and then automatically transferred to the designated image storage facility for the Trust.
The ultrasound practitioner will confirm the images have transferred when writing the report.

For all obstetric ultrasound examinations, the report will be entered into the ViewPoint reporting system.

A copy of the report should be placed in the hospital notes and in the maternal hand-held notes.

The ultrasound practitioner should ensure that the limitations of the scan are understood by the woman and recorded on ViewPoint.

ViewPoint Downtime

The UHL Policy for ViewPoint Downtime must be followed.
If necessary a hand written report must be placed in the woman notes and a copy of this report kept and entered on ViewPoint later.
Images must not be deleted from the ultrasound machine until it has been checked that they have transferred correctly.

First Trimester Pregnancy

All pregnancies will be given an Estimated Due Date (EDD) based on the scan measurements performed as per FASP and RCOG guidelines

EDD is calculated after 10+0 weeks. However if the scan is to be repeated to facilitate screening the EDD should be calculated at the screening scan.

If poor views are obtained transabdominally (TA), a transvaginal (TV) scan may be performed with consent.

Information to be obtained:
Ensure the gestation sac is within the uterus. It is important to check the actual position of the gestation sac within the uterine cavity to exclude the possibility of a caesarean section scar ectopic.

- ☐ Confirm fetal heart pulsations. If no fetal heart pulsations are seen follow the **Early pregnancy pathway on page 9**

- ☐ Check the number of fetuses. If multiple follow the **Multiple pregnancy pathway on page 16**

- ☐ Does the woman wish to have Down's, Edwards' and Patau's screening?
  - Yes – follow **Accepted screening guideline on page 10**
  - No – follow **Declined screening guideline on page 13**

- ☐ If any fetal abnormality is detected refer to Antenatal Midwives

- ☐ Suspected exomphalos should be referred for Consultant opinion through the antenatal services after 12 weeks.

- ☐ Incidental adnexal masses or cysts should be reported as follows:

  - Unilocular cysts less than 5cm do not need to be reported or referred
  - Cystsof 5cm or more diameter - referred to the next available general obstetric clinic

- ☐ Fibroids
  - Fibroid type, size and position should be reported and those near the cervix, placenta or >6cm* should be referred to general obstetric clinic
  - If fibroid >6cm* the woman should go onto the growth scan pathway from 32 weeks gestation

Early pregnancy pathway

This guideline follows the NICE guideline**. Ectopic pregnancy and miscarriage: diagnosis and initial management NG126 April 2019**

A transvaginal (TV) scan should be considered unless declined by the woman if inadequate views achieved by transabdominal (TA) scan.

It is important to determine the presence **and** location of a gestation sac within the uterine cavity.

Then determine viability by identifying a fetal heartbeat.

If no visible heartbeat but there is a visible fetal pole, measure Crown Rump Length (CRL).
If no fetal pole seen, then measure Mean Sac Diameter (MSD).

In all the following cases refer the woman to Gynaecology Assessment Unit (GAU) with a copy of the report.

- CRL < 7mm (TV) with no fetal heartbeat. This is a Pregnancy of Unknown Viability (PUV)

- CRL >/= 7mm (TV) with no fetal heartbeat. This is a missed miscarriage. A second opinion must be sought to confirm and reported.

- Fluid filled sac with a MSD < 25mm (TV) and no fetal pole seen. This is a pregnancy of Uncertain Viability

- Gestation sac with a MSD > or = 25mm (TV) with no evidence of a fetal pole or yolk sac. This is likely to be an anembryonic pregnancy.

If no gestation sac is seen, then a repeat pregnancy test should be performed on /GAU at LRI and if positive this is a Pregnancy of Unknown Location (PUL). If negative, then the woman should be informed of the result.

If under 16 weeks gestation and the woman reports she has had bleeding, then she needs to be referred to GAU at LRI to check rhesus status as she may need Anti D.

The ultrasound practitioner should outline the ultrasound findings and explain the follow up care.

Accepted Combined Screening Pathway

FASP recommends that all women should be offered screening at 11+2 to 14+1 weeks gestation / CRL 45.0 – 84.0 mm to assess the chance of their baby being born with Down's (T21), Edwards' (T18) or Patau's (T13) Syndrome.

- Woman asked to attend with a full bladder
- The procedure should be explained and consent obtained from the woman
- Confirm screening choice and ensure accurately recorded in the scan report and on the blood test request form. Women can choose from the following options
  - not to have screening
  - to have screening for T21 only
  - to have screening for T18 and T13 only
  - to have screening for T21, T18 and T13

Measurements

- EDD will be calculated at the same time as the NT is measured. If a woman is too early for screening the EDD will be calculated at the repeat scan
- CRL measurements taken in accordance with FASP guidance described below and must **NOT** be averaged
- CRL is 45.0mm to 84.0mm then the Nuchal translucency (NT) can be measured
- CRL < 45.0mm then rebook for when between 11+2 to 14+1 weeks
- CRL > 84.0mm then it is too late to obtain NT and the Quadruple test should be offered. The HC should be measured and used to date pregnancy and recorded on the blood test form
- If fetus is too flexed to measure an accurate CRL then the head circumference (HC) should be used to date the pregnancy. Without an accurate CRL measurement the NT cannot be performed and the woman should be sent for Quadruple test. If the HC < 85.0mm then this cannot be used and the woman should be rebooked for a further scan to determine gestational age.
- HC is 85.0mm – 100.9mm then the woman will need to contact her midwife to have the Quadruple test when she is between 15 and 20 weeks and the Quadruple test alert form to remind staff not to take bloods too early will be stapled to the front of the hand held notes. This will be removed when the bloods have been taken.

- HC - 101.0mm to 172.0mm then Quadruple test can be performed that day
- HC > 172.0mm then screening cannot be performed
- NT measurement taken in accordance with FASP guidance described below
- Do **NOT** use the automated settings to measure the NT
- Where the umbilical cord is around the neck, two measurements - one above and one below the cord should be taken and an average of the two used
- Only 1 image each of the NT and CRL measurement is to be stored
- Printed images on thermal paper must only be of the whole fetus and not of the image used for the NT measurement.

Reporting gestational age

- The US EDD will be used as the agreed due date except for IVF pregnancies.

- IVF pregnancies – an US EDD will not be given, and their IVF EDD will be used as their agreed due date.

- Date on which egg collection was performed corresponds to a spontaneous ovulation date (i.e. cycle Day 14) and this is used to calculate the IVF EDD. The "LMP" is therefore 14 days prior to the date of egg collection and can also be used to calculate the EDD. The EDD should be documented in the report.

NT measurement Unobtainable

- If the NT cannot be measured on the first attempt, the woman should be mobilised and a second attempt made shortly afterwards on the same day.

- If on the second attempt the NT cannot be measured, the woman will be offered the Quadruple test between 15 and 20 weeks.

- It should be explained that the Quadruple test is only able to screen for T21.

- Quadruple test alert form will be stapled to the front of the hand held notes. This will be removed when the bloods have been taken.

FASP criteria for measuring NT and CRL

Recommended criteria for the measurement of NT for combined screening	
Midline section	Horizontal sagittal section of the fetus extending from the crown to upper aspect of the heart which may be supine or prone Head in line with the body with the NT visible along the length of the neck Echogenic tip of the nose Rectangular shape of the palate Translucent diencephalon Frontal process of the maxilla should not be visible
Position	Pocket of fluid, at least equivalent in size to the width of the palate, should be visible between the fetal chin and chest
Magnification	The section should fill over 60% of the screen
Calliper placement	Callipers should be placed on the upper and lower edges of the NT Widest part of the NT should be measured
Image archiving	NT should be measured at least twice and the maximum measurement that meets the criteria recorded Image demonstrating the measured NT which has been reported should be stored

Declined Combined Screening Pathway

- Parents are to be made aware that despite declining screening, ultrasound can detect problems with the pregnancy, of which they will be informed
- Perform dating scan and calculate EDD using process detailed above
- Document that screening was discussed and declined at the scan in the report

Recommended criteria for measurement of CRL for pregnancy dating and combined screening	
Midline section	Sagittal section of the fetus with head in line with the full length of the body Echogenic tip of nose Rectangular shape of the palate Translucent diencephalon CRL axis between 0° and 30° to horizontal Clearly defined crown and rump
Position	Pocket of fluid, at least equivalent to the width of the palate, should be visible between the fetal chin and chest Fetal palate angle should be 30° - 60° to the horizontal Nasal tip should be level or above the anterior abdominal wall
Magnification	Entire CRL section should fill over 60% of the screen
Calliper placement	Correct calliper placement on outer borders of crown and rump Longest length of fetus should be measured
Image archiving	CRL should be measured at least twice and maximum measurement that meets the criteria should be recorded Only the image demonstrating the measured CRL which has been reported should be stored

Communication and Follow up care

- Explain how screening test results will be received
- Anomaly scan appointment should be made before 20+6. The 20+6 date will be calculated by ultrasound practitioner and written in the report and on request form to ensure it is booked within the correct timeframe. Women who are to have uterine artery Dopplers performed at anomaly scan should be booked at more than 20 +0 weeks BUT NO LATER THAN 20+6.
    - Blood test form to be completed. Ultrasound practitioners are responsible for ensuring the following information is included on the blood test form.
        - Date of ultrasound scan
        - Practitioner's unique DQASS identity code
        - CRL or HC measurement
        - NT measurement if applicable
        - Screening option chosen by woman
        - Number of fetuses and chorionicity (If chorionicity uncertain refer to Multiple pregnancy pathway on page 15)

Ensure that if the woman opted for combined screening but was too late or the NT could not be obtained the blood test form documents this, the option for combined screening is crossed out and the 2nd Trimester Quadruple test is selected.

If the woman presents for her first scan between 20 – 23+6 weeks and is too late for trisomy screening please refer to ANC midwives to explain that screening with the combined test or the Quad test is no longer possible and we are reliant on the anomaly scan. The anomaly scan pathway must be completed. If the anomaly scan is incomplete at the first attempt, a rescan must be booked as soon as possible, ideally by 23+6 weeks.

Normal dating scan and NT measurement is less than 3.5 mms

- Refer to Midwifery Care Assistant for blood tests and to have Customised Growth Chart (CGC) created.
- This will be printed on blue paper so it is easy to locate in the handheld notes.

Management of increased NTs – 3.5mm or above

- Inform parents of increased measurement
- Calculate date for anomaly scan and complete paperwork including completing the blood test request for Combined test as normal
- Refer to Antenatal Midwives to be seen after bloods for Combined screening

test taken

- If declined screening but an increased NT is seen then refer to Antenatal Midwives for referral to FM consultants

Late Bookers >24 weeks

- EDD on the first scan may be inaccurate and so a repeat scan is required in 3-4 weeks to be booked by ultrasound practitioners to check appropriate growth.
- Anomaly scan to be attempted and reported. If anatomy cannot be seen then no rescan will be arranged for this purpose
- Refer to a Consultant clinic.

Multiple Gestations

- EDD calculated using data from the largest fetus – refer to **multiple pregnancy pathway below**

Non-invasive prenatal Testing (NIPT)

- In view of the potential risk of "no result" with NIPT, women should continue with NHS combined screening even if they plan to have private NIPT.

- Then if there is "no result" from NIPT, they will have had the NHS screening test, rather than being "too late for NT" and only able to have the Quad test.

- If women present with their NIPT result prior to combined screening they should still be offered screening and if they decline then this should be clearly marked as "Trisomy screening declined" on the scan report.

Multiple pregnancy pathway

<u>All multiple pregnancies are to be referred to Antenatal midwives</u>

To calculate the gestational age and EDD the measurements of the larger baby should be used (NICE Guideline 129 Sept 2011)

Fetal position is to be reported using terms left, right, upper or lower (NICE quality standards (QS46) Sept 2013)

If a multiple pregnancy is identified in the first trimester it is important that the chorionic and amniotic membrane status is determined and reported:

- MCMA – monochorionic monoamniotic

- MCDA – monochorionic diamniotic
- DCDA – dichorionic diamniotic

An image demonstrating the chorionic/amniotic status should be stored

If unable to determine chorionicity, a second opinion should be sought from another ultrasound practitioner or Fetal Medicine (FM) team.

At 16 – 20 weeks, the Lambda sign is unreliable for detecting chorionicity, assessment of fetal sex and placental position is preferable for assessing chorionicity.

MCMA

- Single placenta
- No dividing membrane seen. Should be confirmed with TV scan.
- Refer to Antenatal midwives for referral to FM
- Same sex

MCDA

- Single placenta
- Thin membrane and T-sign at intersection of membrane and placenta
- Refer to Antenatal midwives for referral to FM
- Same sex

DCDA

- 2 separate placentas
- Lambda sign – extension of placental tissue into the base of the inter-twin membrane
- Thick membrane – more than 2 mm
- Referral to Antenatal midwives for twin discussion
- Different sex (50% of cases)

Triplet or higher order multiple pregnancy

Refer to Antenatal Midwives for discussion and referral to FM and arrange NT only screening if required.

Accepted Combined screening and multiple pregnancy

- Measure NT and CRL as described previously
- On blood test form ensure chorionicity is correctly selected and documented.

Trisomy screening if the chorionicity is unclear

- Complete the request form including NT and CRL measurements and serum screening, with a note saying referred to Consultant re: chorionicity. These women may have their bloods taken and sent to the laboratory.

- Once chorionicity has been established this information is passed to the laboratory.

Discrepancy in measurements

Discordant CRLs

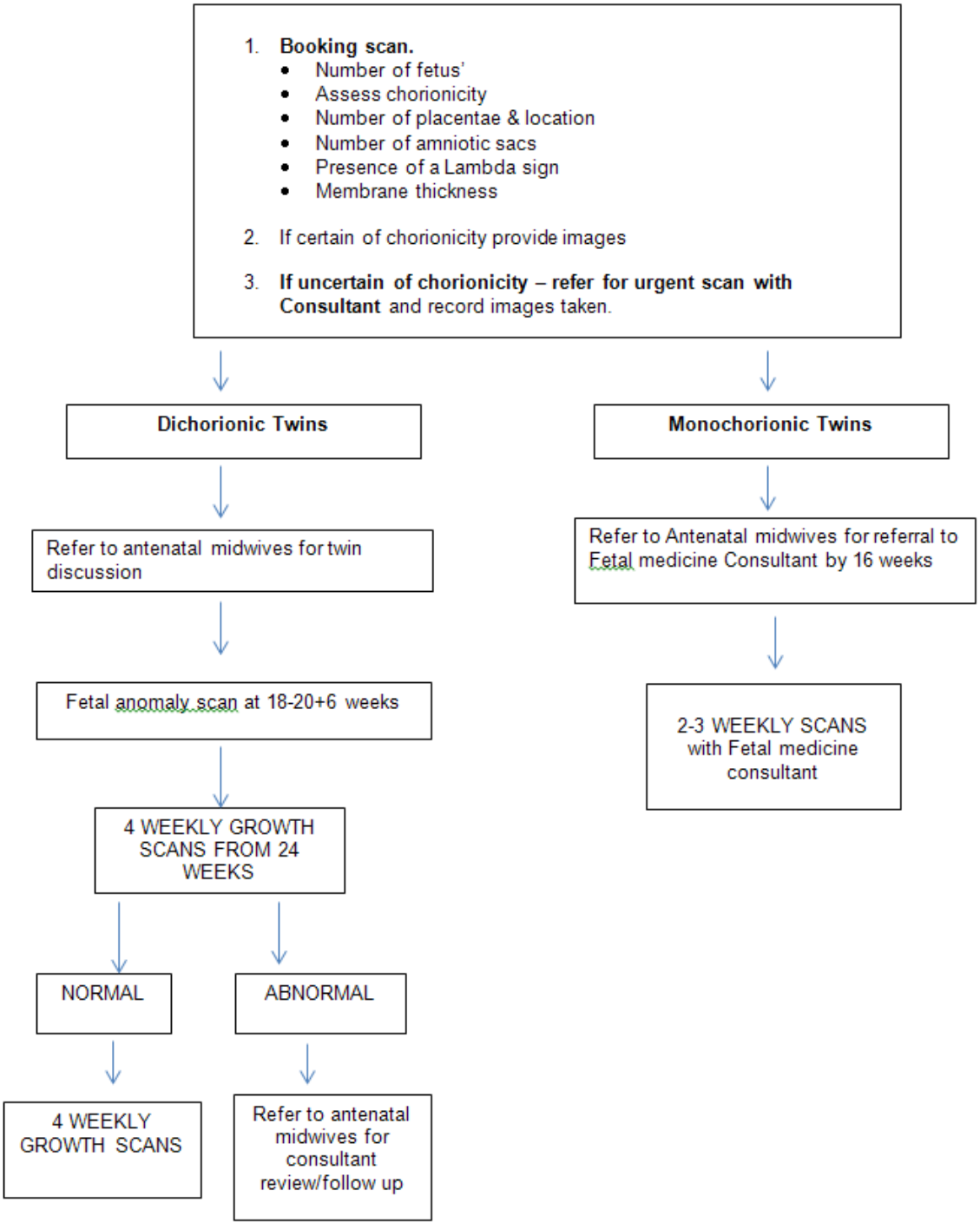
If there is a discrepancy in CRLs then follow up is required. It is essential to ensure the discrepancy is not due to fetal position by measuring individual HC, AC and FL.

- 2mm – 5mm CRL discrepancy – rescan in 2 weeks
- >5mm refer to FM team

If one twin has a CRL less than 84.0mm and the other is greater, then Quadruple test should be offered providing the HCs are greater than 85.0mm.

The UHL Multiple pregnancy care pathway should be followed.

Multiple pregnancy care pathway.



Vanished/Demised Twin

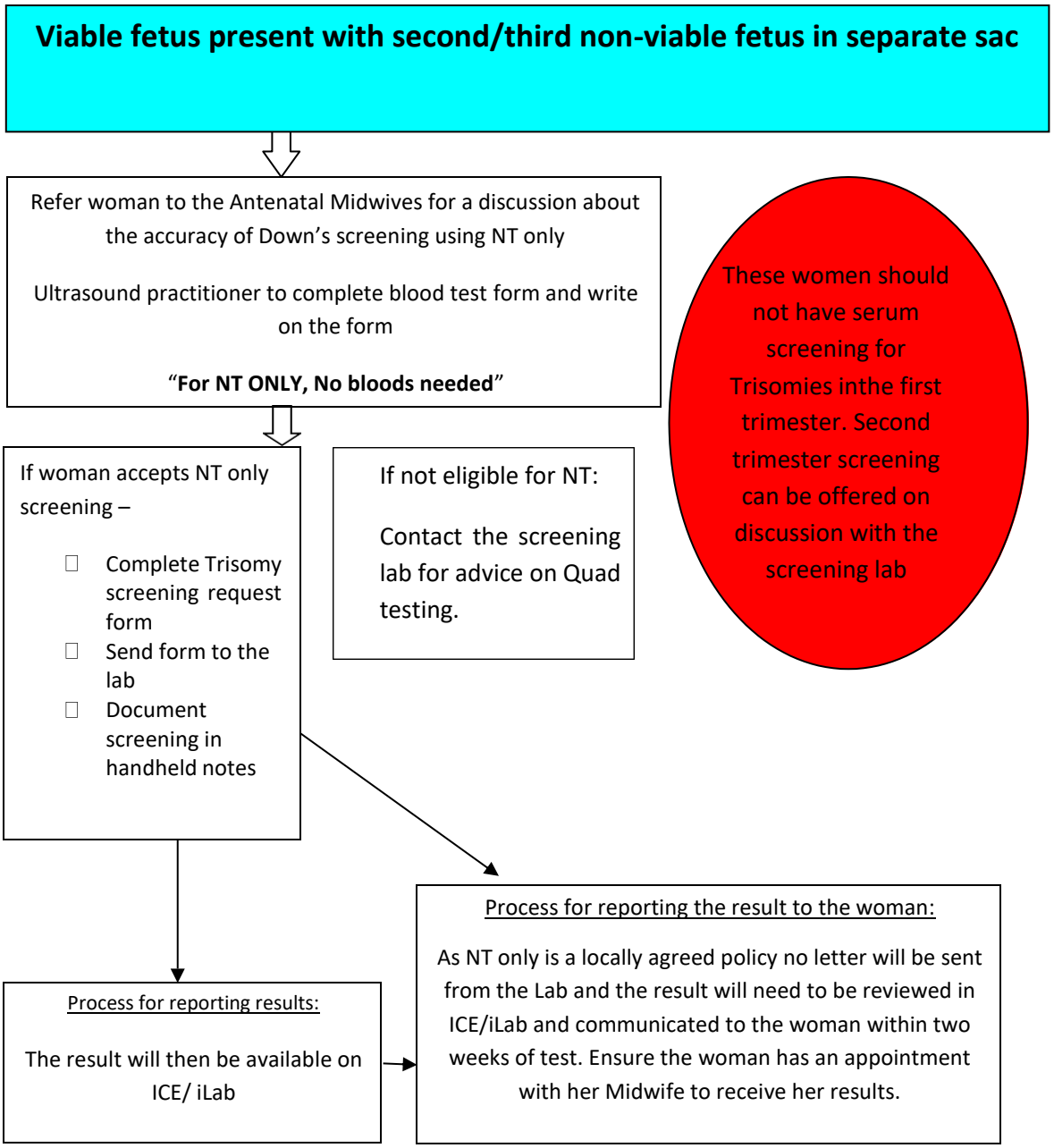
This is when a non-viable second or third fetus is seen. Screening can be offered using NT only; the chance will be calculated by the NT measurement alone.

The ultrasound practitioner will need to write "**For NT only, no bloods needed"** on the trisomy screening request form. The woman must be referred to the Antenatal Midwives to discuss the accuracy of screening using the NT measurement alone. The scan report and completed trisomy screening request form should be sent to laboratory. No biochemistry is required. **This service is no longer a recognised screening pathway** and this should be communicated to the woman as part of her decision to have screening as it may be withdrawn by the laboratory in future.

If it is too late for NT then an explanation should be given to the woman that Trisomy screening for Edwards and Patau's cannot be performed using biochemistry. However second trimester screening for Trisomy 21 could now be offered on a case by case basis following discussion with the screening laboratory

If the second sac is empty (no evidence of a fetal pole), the examination should proceed as for a singleton pregnancy and combined screening offered.

UHL process for Trisomy Screening following diagnosis of a 'Demised (Vanished) Twin' in a DCDA (or TCTA) pregnancy



Cervical Length

Indications

Referral from consultant led clinic.

Ultrasound Technique

Transvaginal scan performed with consent.

Longitudinal section of the cervix to be imaged showing internal and external os.

The longest section of the cervix is measured from internal os to external os.

Images of measurements stored.

Any funnelling or abnormalities of the cervix are to be reported and image stored. Where these are performed in antenatal clinic the image should be printed and stored in the patients notes.

Report

The longest of 3 measurements of the cervical length should be documented in the report.

18 - 20+6 week Fetal Anomaly Scan

FASP recommends a mid-pregnancy scan which is undertaken between 18+0 to 20+6 weeks of pregnancy to screen for major fetal anomalies.

The examination should be undertaken in accordance with the 18+0 to 20+6 FASP ultrasound scan base menu and fetal cardiac protocol as outlined in FASP Programme Handbook 2015

The purpose of this scan is explained in the information provided by the National Screening Committee 'Tests for You and Your Baby' document, which all women are signposted to at their booking appointment and consent is documented by the Community Midwife in the hand-held notes.

Women who wish to have a fetal anomaly ultrasound scan, but do not wish to be informed if abnormalities are found, should be advised that all significant findings seen on scan will be reported and therefore should consider not having fetal anomaly ultrasound screening.

Fetal Anatomy Assessment

The 18+0 to 20+6 FASP ultrasound scan base menu specifies measuring techniques and defines the anatomical structures to be assessed. This promotes consistency in the examination.

Six specific fetal anatomical sections should be identified at examination. An image of these six sections should be stored. <u>There is no requirement to routinely store any other images. It is not necessary to annotate these routinely stored images.</u>

- Head circumference (HC) demonstrating HC measurement and measurement of the atrium of the lateral ventricle
- Suboccipito-bregmatic view demonstrating measurement of the transcerebellar diameter
- Coronal view of lips with nasal tip
- Abdominal circumference (AC) demonstrating AC measurement
- Femur length (FL) demonstrating FL measurement
- Sagittal view of spine including sacrum and skin covering

HC, AC and FL measurements should be taken to assess growth velocity in a pregnancy where the EDD was previously assigned in line with nationally approved charts and tables

If the EDD was not previously assigned, the pregnancy should be dated by HC or FL. *Loughna P, Chitty L, Evans T and Chudleigh T - 'Fetal size and dating: charts recommended for clinical obstetric practice' Ultrasound (2008)*

A **single repeat scan** should be offered and completed by 23+0 weeks gestation in cases where the image quality of the first examination is inadequate and is compromised by one of the following:

- increased maternal body mass index
- uterine fibroids
- abdominal scarring
- sub-optimal fetal position

The date when the lady is 23+0 weeks must be documented on the scan outcome form so that the repeat scan appointment is booked within the timeframe.

Where an adequate assessment of the fetal anatomy remains compromised after the repeat scan no further scans will be booked, the woman should be told that the screening is incomplete and this should be recorded

If first examination is sub-optimal and the ultrasound practitioner is suspicious of a possible fetal abnormality, a second opinion should be sought and this request documented

Fetal anatomy to be assessed

As noted, only images of the six specific fetal anatomical sections described previously need to be stored. These are highlighted below in **bold.**

The following lists all the fetal anatomical structures to be evaluated, including those for which images should not be stored (in italics).

Head

- **HC measurement and measurement of the atrium of the lateral ventricle - STORE IMAGE**
- **Suboccipito-bregmatic view demonstrating measurement of the transcerebellar diameter - STORE IMAGE**
- *HC Shape – normal oval shape. Exclude lemon shape / frontal bossing*
- *Midline echo*
- *Choroid plexus – at normal angle to midline*

- *Cavum septum pellucidum identified*
- *Lateral ventricles – posterior horn atrium to be measured inner to inner at the level of the glomus of the choroid plexus. Measure at the widest part and aligned perpendicular to the long axis of the ventricle.*
  - *Normal < 10mm – see* ***normal variant pathway on page 27***
- *Cerebellum - transcerebellar diameter should equate in mm to gestational weeks. Assess shape – normal dumbbell shape with vermis intact, exclude 'banana' shape*

Face

- **Coronal view of lips with nasal tip – STORE IMAGE**

Neck

- *Assess nuchal fold and measure if appears increased. Normal < 6mm between 16 – 23 weeks.* ***See normal variant pathway on page 29***

Spine

- **Sagittal view of spine including sacrum and skin covering – STORE IMAGE**
- *Assess entire length in transverse, coronal and sagittal planes*

Chest

- *Ensure normal shape*
- *Normal lung echogenicity*
- *Diaphragm – confirm integrity*

Abdomen

- **Abdominal circumference demonstrating AC measurement – STORE IMAGE**
- *Exclude large abdominal cysts or masses*
- *Assess for echogenic bowel. If echogenic bowel is suspected then a sagittal/coronal view of the iliac crest should be obtained and the bowel compared to it by turning the gain down.*

  Only if the bowel is as bright as the iliac crest should they be referred to FM Consultants for review. Bowel not as bright as the iliac crest does not carry the

*same associations and does not need to be referred. S**ee normal variant pathway on page 29***

- *Stomach*
  - *Confirm sited below left hemi-diaphragm*
  - *Ensure fluid filled. Exclude double bubble appearance*
- *Abdominal wall*
  - *Confirm integrity*
  - *Confirm normal cord insertion – exclude gastroschisis/ omphaloceole*
- *Kidneys*
  - *Confirm presence of two kidneys*
  - *Assess size and echogenicity*
  - *If renal pelvis appears prominent – measure in anterior-posterior (AP) diameter. If >7.0mm see **Renal pelvis dilatation pathway on page 28***
- *Bladder – confirm fluid filled*

Limbs

- **Femur length demonstrating FL measurement – STORE IMAGE**
- *Confirm presence of four limbs. The presence of both hands and feet should be assessed; however fingers and toes are not counted.*
- *Long bones are to be subjectively assessed to ensure normal length (if in doubt measure) and in proportion to each other*
- *Legs – confirm presence of femur, tibia, fibula and foot on each side*
- *Assess foot/ leg alignment*
- *Arms – confirm presence of humerus, radius, ulna and hand on each side*

Heart

- *Confirm normal heart rhythm*
- *Confirm correct position and orientation*
- *Confirm normal abdominal situs*
- *4 chamber view*
  - *Heart should not fill more than one third of the thorax*
  - *Right and left atria should be equal in size*
  - *Right and left ventricles should be equal in size*
  - *The atrial/ventricular valves should open and close with each cycle*

- *Ventricular septum should be intact*
- *Normal Atrial septal defect seen – foramen ovale*
- *AV septa should meet as an offset crux – the tricuspid valve seen nearer to the apex of the heart*

- *Outflow tract views*
  - *Aorta/ Left ventricular outflow tract*
  - *Pulmonary artery/ Right ventricular outflow tract*
  - *3 vessel trachea view*
    - *Vessel number – 3 – superior vena cava, aortic arch and ductal arch*
    - *Vessel size – both ducts should be approximately equal in size*
    - *Alignment – aortic arch and ductal arch to left of trachea*
    - *Arrangement – vessels meet in a **V** shape. **U** or ring shape is abnormal.*

Amniotic fluid

Subjective assessment of the liquor volume should be performed. If an increase or reduction is suspected then the Deepest Vertical Pool should be measured. If the DVP is outside the upper or lower centile lines reported on Viewpoint refer to antenatal midwives.

Placenta localisation

The placenta should be located and its position reported. **An image should be stored.** It is important to ensure the bladder is not overly full as this can make the placenta appear to be low.

The placenta is determined to be low lying at 20 weeks if it is reaching or covering the internal os (IO).

For a low lying placenta please refer to **the placental site assessment on page 39.**

Uterus and adnexae

Identify normal pelvic anatomy. Document the presence of fibroids, cysts or other pathology in the report.

Uterine artery Dopplers should be performed for women identified as being at high risk for impaired fetal growth (Saving Babies Lives V2 see appendix). If possible both Uterine Artery Doppler waveforms should be evaluated and used to establish the fetal surveillance pathway. If at least one is low resistance (PI below 90%ile) serial scans commence at 32 weeks

gestation. If BOTH are high resistance (PI above 90%ile) then serial scans commence at 28 weeks. If only one is obtainable and is high resistance serial scans start at 28 weeks but if it is low resistance serial scans start at 32 weeks. If neither are obtainable then start growth scans from 28 weeks.

Refer to the fetal surveillance guidelines for further detail regarding the appropriate pathway depending on whether the PI is within the normal range (low resistance) or above the 90th centile (high resistance).

Abnormality or normal variant detected

- The ultrasound practitioner must communicate any concerns to the woman and her partner regarding the scan findings
- They should be offered the opportunity to view the suspected abnormality if they wish.
- The antenatal midwives must be informed of the findings at the time of the initial scan so that they can offer support to the parents and arrange further investigation.
- A second opinion within the ultrasound department may be sought

- **Images of the suspected abnormal findings must be stored**

- Findings should be entered on ViewPoint by selecting from the drop-down menus where possible. This enables accurate data collection for statistical analysis and clinical audit purposes.

- For the on-going management of pregnancies where a fetal anomaly is suspected please refer to the "Referral When a Fetal Abnormality is Detected in the Antenatal Period' guideline.
- Antenatal screening team will complete the National Congenital Anomaly and Rare Diseases Registration form (NCARDRS).

The aim is for all suspected abnormalities to be reviewed by a Fetal Ultrasound Specialist within 3 working days

Incomplete or suboptimal examination

If unable to see a particular structure then the woman should be mobilised and a repeat attempt made on the same day. If the examination remains incomplete for the structures inadequately seen the reasons for this should be stated in the report, the woman informed of the limitations and a rescan is to be booked no later than 22+6 weeks.

If, at the second scan the views remain suboptimal then no further scans will be arranged and the anomaly scan will be reported as incomplete (FASP 18-20+6 National Standards 6.3)

After the scan

Normal findings must be entered on ViewPoint via fetal biometry 'checklist'.

The ViewPoint report refers the woman to the relevant section of the 'Screening tests for you and your baby' document explaining the limitations of ultrasound scanning in pregnancy.

On completion of the examination the maternity handheld notes should be checked to see if the woman is on the scan pathway and requires serial growth scans.

If on the scan pathway then a growth scan appointment should be made. The ultrasound practitioner will calculate the date that the woman will be 28+0 weeks or 32 +0 weeks depending on which pathway the woman should be following. A growth scan will be performed before, but as near as possible to this date.

If not on the Fetal Growth Scan screening pathway the woman should be advised that she will be referred back to her community midwife for on-going care.

Normal variant pathway

There are 5 normal variants that should be referred to antenatal midwives to arrange FM appointment (aim for 3 working days) as appropriate.

1. Nuchal fold (>6mm)
2. Ventriculomegaly (atrium >10mm)
3. Dilated renal pelvis – AP measurement ≥7.1mm (unilateral or bilateral) see **Renal pelvic dilatation pathway below**
4. Echogenic bowel (with density equivalent to bone, reduce gain to assess)
5. Small measurements compared to dating scan (less than 5th centile on national charts)

There is no requirement to identify or report the following

- Choroid plexus cysts
- 2-vessel cord
- Dilated cisterna magna
- Echogenic foci in the heart

Renal pelvis dilatation pathway

Renal pelvis dilation is when the AP diameter of the renal pelvis is ≥ 7.1mm whether unilateral or bilateral

- Explain that this may just be part of normal development and will be reviewed during the 28-34 weeks stage.
- Refer woman for fetal medicine review (aim for 3 working days)
- If still present at the later scan, explain that the child will be placed in the renal protocol and that the child will be followed up through early childhood.
- Complete “Fetal renal tract abnormality results” sheet and file in the hospital notes (see appendix 1).
- Show the woman the fetal renal tract abnormality results sheet to ensure compliance.

Renal Dilatation Follow up 28-34 week scan

- Measure and image the AP diameter of each kidney.
- Identify the bladder where possible.
- Measure the Liquor volume.

If the AP diameter measurements of the kidneys are within the **normal** range (<10mm) the woman should be referred back to her community midwife. No further scans required.

If 10mm or greater, refer to Antenatal midwives for Paediatric Alert Form to be completed. The child will be placed on the renal anomaly protocol and followed up through early childhood.

The **Fetal Renal Tract Abnormality Results Sheet (Appendix 1)** should be completed and placed in the woman's hand held notes.

Amniotic Bands or Folds

Amniotic bands are extremely fine fibrous strands of amniotic membrane; these fine threadlike structures are barely visible on ultrasound and stretch from the amniotic membrane into the amniotic cavity. The amniotic bands may wrap round fetal limbs causing disruption of blood supply and the possibility of amputation.

When amniotic bands are demonstrated the detailed assessment of fetal anatomy including limbs, hands and feet should be completed and referral to the Antenatal Midwives is appropriate. After discussion with a fetal medicine specialist a fetal medicine scan may be arranged for further assessment.

Amniotic folds or sheets are thick bands of tissue which run along the uterine wall; in the majority of cases blood flow is seen with Doppler. Amniotic folds do not interfere with the movements, development and growth of the fetus, and are rarely associated with any complications. They may however interfere with fetal rotation in the later stages of pregnancy resulting in breech presentation or transverse/unstable lie. No follow up care is required.

Fetal Growth (see also Fetal Surveillance: Small for Gestational Age fetus UHL Obstetric Guideline**)**

All women should be assessed at booking for risk factors for a SGA fetus /neonate to identify those who require increased surveillance (see SBLV2 algorithm (Appendix 6). Each woman's pathway will be recorded in the boxes on the triage sheet of their loose leaf handheld notes.

- If no requirement for increased surveillance then the customised growth charts (CGC) should be used by midwife to plot fundal height (SFH) from 27-28 weeks.
- Women who have an increased risk identified should have a plan made for serial growth scans on the Fetal Growth Scan Screening pathway. If combined screening identifies a low PAPP- A (<0.41MOM), these women will also require uterine artery Doppler at their anomaly scan to help plan serial growth scans in the third trimester. These will commence at either 28 or 32 weeks depending on the results of the uterine artery Doppler. *After the scan, the ultrasound practitioner will send the woman to the midwives who will be expecting her. A blue sticker will be added to front of notes and the triage sheet will be amended with the updated pathway.*
- If echogenic bowel (bowel echogenicity as bright as bone) is detected at anomaly scan it should be confirmed by an appropriate Consultant and then increased growth surveillance is recommended. A blue sticker will be added to the front of their notes to indicate a change in pathway or the notes amended with the updated pathway after consultant scan. Uterine artery Doppler assessment should be performed to determine whether to start serial growth scans at 28 weeks (neither PI <90centile) or 32 weeks (at least one PI <90centile). The woman should be reviewed in fetal medicine to evaluate and discuss the risk of fetal aneuploidy.
- Some women will require increased surveillance due to issues arising later on in their pregnancy. These will be referred by clinicians using the Maternity Ultrasound Request Form.

Increased surveillance means serial ultrasound measurement of fetal size and umbilical artery Doppler at 3 -4 week intervals until delivery. If fetus is noted to be small for gestational age (EFW <10centile on customised growth chart) then scans should be at 2-3 week intervals.

If Scan pathway High risk - at the anomaly scan complete a clinic outcome form to book the first growth scan for 28 **OR** 32 weeks depending on result of Uterine Artery Doppler assessment.

Moderate or "other" risk book first growth scan at 32 weeks.

Any fetus at the anomaly scan where the estimated fetal weight is measured as less than the 10th centile for gestation using the graph on viewpoint should be moved to the high risk scan pathway and have uterine artery Doppler performed if the anomaly scan is after 20 weeks. If the anomaly scan is before 20 weeks a plan for growth screening scans at 4 week intervals starting at 28 weeks is appropriate. Consideration should also be given to whether the small size may be related to aneuploidy and whether the woman needs review by a fetal medicine consultant.

Customised Growth Charts (CGC)

Each woman will have a CGC generated following her dating scan. Serial measurement of symphysis fundal height (SFH) is recommended at each antenatal appointment from 27 – 28 weeks of gestation for women who are recognised as low risk and suitable for midwife led care. The result should be plotted on the customised growth chart using a cross.

For women not already on a serial growth scan pathway other Indications for a growth scan are:

- First SFH measurement below 10th centile
- Static growth: no increase in sequential measurements of SFH
- Reduced growth velocity: SFH curve not following slope of the curve on the chart
- SFH measurement showing excessive growth not following the slope of the curve of the 97th centile on the customised GROW chart

- Note: A first or subsequent SFH measurement above the 90th centile is not an indication for a growth scan. A scan would be indicated if there was a clinical suspicion of polyhydramnios.

Fetal Survey at Growth scan

- Confirm fetal heart beat present
- Establish fetal presentation and lie
- Establish placental position – **store image**
- Identify stomach, kidneys and bladder

Measurements

Fetal biometry required is HC, AC and FL **– store images**

A minimum of two comparable measurements of each parameter should be taken and stored. Comparable can be described as +/- 10mm for HC and AC and +/- 2mm for FL.

- Estimated fetal weight (EFW) is calculated from the average of these measurements.
- If unable to measure HC then report reason for this and use Birth Weight (multiple parameters – AC and FL) Hadlock *et al*, 1985 chart
- If femur length is below the 10th centile then all long bone measurements should be recorded.
- Assess liquor volume by measuring DVP – **store image**
- Perform umbilical artery Doppler – **store image**
- Minimum time interval between growth scans is two weeks. For established SGA fetus' 14-21 days is appropriate (as near to 21 days as possible), for fetus's with appropriate growth velocity on a scan screening pathway 21-28 days is appropriate (as near to 28 days as possible). Delay of ultrasound beyond these timesales should be unusual and avoided if possible.

Customised growth charts

- Estimated fetal weight (EFW) should be plotted on the CGC with a **circle (Θ)** at the relevant gestation.

- EFW can be plotted from 24/40 weeks if for growth and not a late booking anomaly scan
- EFW should be calculated using HC, AC and FL.
- If unable to measure HC accurately a combination of AC and FL should be used and this stated in report.
- When plotting EFW it is important to note the trend of growth as well as the actual measurements
- EFW should lie between the 10th and 90th centiles and serial scanning should demonstrate growth occurring approximately parallel to the centile curves
- When abnormal growth pattern is seen, it is important to first check the EFW has been plotted correctly and the correct EDD has been used to create the chart before referring onwards

Reporting and follow up care

If concerns regarding presentation, abnormal Liquor or Doppler follow referral advice in relevant sections in this guideline

- All growth measurements and measurements of amniotic fluid must be electronically saved in ViewPoint and a report generated.
- **DO NOT PRINT** individual parameter charts or EFW charts.

Normal EFW

- If the EFW plots between the 10th and 90th centile **and** is following the centile curve **and** liquor volume **and** Doppler are normal, report as normal.
- If on the scan pathway the ultrasound practitioner will rebook the next scan in 3 to 4 weeks (as close to 4 weeks as possible) by completing the clinic outcome slip. If the woman is on a SFH pathway no further scan is required and the woman will go back to having SFH measurements for monitoring of fetal growth.

Abnormal scan

Refer to ANC midwives if any of the following are seen.

- EFW is **below** 10th centile.

- Reduced growth velocity of EFW not following slope of curve on the chart. Sub-optimal fetal growth after 34 weeks gestation may be defined as an EFW gain of less than 20g per day over a minimum period of 2 weeks or 14 days. Please refer to the fetal surveillance guideline.
- Oligohydramnios or polyhydramnios
- Abnormal umbilical artery Doppler
- Significantly increased growth velocity not following slope of curve on the chart refer to midwives

EFW above 90th centile

- Refer to ANC midwives who will
  - Book an appointment for GTT if possible before 32 weeks plus 0 days gestation or take an HBA1c if more than 32 weeks and 0 days and book an appointment in general obstetrics clinic at approximately 38 weeks gestation.
  - If on scan pathway book next scan for 3-4 weeks (as close to 4 weeks as possible) as usual, otherwise no further scans to be booked at this time

Individual growth parameters

If there is concern about the growth of an individual parameter e.g. HC or FL below 10th centile then this chart should be generated in the Viewpoint report and the woman referred to ANC midwives. Use the centile box in ViewPoint to display 10th and 90th centiles on the charts.

The next scan appointment will be generated by the midwives/clinicians and not the ultrasound practitioners.

Report these scans in diagnosis section by using free text to alter drop down options to accurately describe findings

Umbilical Artery Doppler Assessment

Indications

Umbilical artery Doppler should be performed on all growth scans

Ultrasound Technique

- Identify a free loop of the umbilical cord with colour Doppler, preferably away from the fetal anatomy.

- Use Pulsed wave Doppler and adjust the base line, Pulse Repetition Frequency (PRF) and Doppler gate size and angle to obtain an optimum trace.

- Abnormal trace. This may be the result of an inaccurate measurement the woman should be walked and rescanned. This helps to ensure that the cord is not compressed.

- An image of the spectral trace should be recorded

Report

Select the relevant diagnosis from the drop-down menu.

- End diastolic flow (EDF) normal
- EDF absent
- EDF reversed

Communication and follow up Care

- Normal EDF. The woman should be advised that she will be referred back to her planned antenatal care.

- Absent or reversed EDF is seen then an urgent medical review is warranted via Antenatal Midwives or MAU / Ward as applicable.

Amniotic fluid volume

Amniotic fluid volume increases from 500ml at 20 weeks to approximately 1000ml at 34 weeks and decreases to a volume of 700ml at term.

The amount of liquor in the amniotic cavity at any gestational age reflects fetal well-being. It is acknowledged that at present accurate measurements of amniotic fluid volume is not possible.

There are 2 assessments available-Deepest Vertical Pool and Amniotic Fluid Index

- Deepest vertical Pool (DVP) is the preferred method when subjective assessment suggests variance of amniotic fluid volume from normal.

- In some clinical circumstances Amniotic Fluid Index may be useful for serial assessment of fluid volume. DVP of amniotic fluid (cord free) is measured in each of the four quadrants of the uterus. The sum of these measurements provides the AFI. Colour Doppler may be utilised to avoid measuring pockets of fluid that contain loops of umbilical cord.

Report

- All DVP/AFI measurements must be reported. The measurements are plotted according to the agreed EDD.

Communication and Follow Up Care:

Normal DVP: the woman is advised that she will be returned to the community midwife or referring clinic as appropriate.

Abnormal DVP:

Polyhydramnios (DVP >upper centile on ViewPoint chart)

- The fetal lips, stomach and bladder should be examined and findings noted on the scan report
- Refer to the antenatal midwives who will follow the UHL Polyhydramnios Flowchart at Appendix 3

Oligohydramnios (DVP <lower centile on ViewPoint chart)

- If there is oligohydramnios the fetal kidneys and bladder should be examined and findings noted on the scan report.
- Refer to antenatal midwives for assessment and consultant review.

Intrauterine Fetal Death (IUFD)

- In the absence of a fetal heartbeat post 14 weeks HC should be measured.

- The ultrasound practitioner should confirm the absence of fetal heartbeat with the woman and her partner.

- If the mother and her partner wish to see the scan, they should be shown.

- Obtain a second opinion where possible

Prior to 16 weeks

The woman should be referred to the Gynae assessment unit (GAU), LRI.

Post 16 weeks

The woman should be referred to the Antenatal Midwives for follow up care and support.

Placental Site Assessment

Placenta praevia

Placenta praevia exists when the placenta is inserted wholly or partly into the lower segment of the uterus.
A low lying placenta at 20 weeks is one that covers or reaches the internal os.

Placenta accreta describes a morbidly adherent placenta which penetrates through the decidua basalis and into the myometrium.

Please see **Low lying Placenta Pathway (Appendix 2)**

Ultrasound examination of the Placenta

Scan the uterus to establish the general position and structure of the placenta. Taking care to note and report any fibroids located near the cervix.

If the relationship of the lower edge of the placenta cannot be clearly demonstrated, or if the placenta is reaching or covering the internal cervical os on the trans abdominal scan then a transvaginal scan with consent should be considered to confirm this.
It is important that the maternal bladder is not overfilled when assessing placenta location.

An image must be recorded of the lower placenta edge in relationship to the internal os.

Report and Follow Up care

At 20 weeks a low lying placenta is defined as one that reaches or covers the internal os (IO).

- On TV scan placenta does not cover or touch the internal os, no further scans are required.

- Placenta reaches or covers the internal cervical os; a further scan is required as soon as possible after 32 weeks.

If the placenta is low lying then in ViewPoint select placenta praevia and report whether placenta is anterior or posterior.

All women who have a low lying placenta (covering or reaches the internal cervical os) at the 20 week scan should then be referred to the next available antenatal clinic to assess for any risk factors for morbidly adherent placenta following East Midlands Fetal Medicine Network Regional Guideline Diagnosis and management of abnormally invasive placentae as this assessment lies outside of the scope of practice for sonographers and midwives (**Appendix 4**).

If a woman with a low lying placenta at the anomaly scan is admitted with an episode of vaginal bleeding, it may be appropriate for an ultrasound scan to be performed for placental localisation earlier than the scheduled scan.

Follow up Ultrasound Scans at 32 / 36 weeks Gestation

Scan the uterus transabdominally to establish the general position and structure of the placenta.

A measurement of the relationship of the internal os and the lower edge of the placenta must be taken and an image recorded.

At this gestation the placenta is considered low lying if the lower edge of the placenta is less than 2 cm from the internal os.

If placenta appears low lying a TV ultrasound examination must be performed with consent.

The measurements must be entered on the ViewPoint report

32 week scan

If the lower placenta edge is **more than 2cm** from the internal os, therefore no longer low lying, the woman can return to her planned antenatal care.

If the placenta is **less than 2cm** from the internal os, the woman should be reviewed in the appropriate Consultant Led Clinic at 34 weeks and a further scan booked at 36 weeks.

36 week scan

If the placenta is **less than 2cm** from the internal cervical os, the woman should be referred either to the antenatal midwives, or if the next the General Obs Clinic/ Consultant Led Clinic is within 2 -3 days it is appropriate for her to be reviewed in clinic.

If the placenta is **not** low lying the woman should be advised that she will be referred back to her community midwife, then refer to antenatal midwives to cancel possible caesarean section appointment that may have been made already.

Additional Imaging to detect morbidly adherent Placenta

Women who have had uterine surgery such as caesarean section, myomectomy or repeated surgical evacuations are at risk of abnormal placentation.

The assessment should be performed by a consultant in accordance with defined ultrasound criteria for diagnosis as follows:

Grey scale:

- loss of the retro placental sonolucent zone
- irregular retro placental sonolucent zone
- thinning or disruption of the hyperechoic serosa–bladder interface
- presence of focal exophytic masses invading the urinary bladder
- abnormal placental lacunae

Colour Doppler:

- diffuse or focal lacunar flow
- vascular lakes with turbulent flow (peak systolic velocity over 15 cm/s)
- hypervascularity of serosa–bladder interface
- markedly dilated vessels over peripheral sub placental zone

Three-dimensional power Doppler:

- numerous coherent vessels involving the whole uterine serosa–bladder junction (basal view)
- hypervascularity (lateral view)
- inseparable cotyledonal and intervillous circulations, chaotic branching, detour vessels (lateral view)

Presentation scan

Presentation scans will usually be performed in the antenatal clinic / MAU / Ward responsible for the woman's care using the portable scanning machine.

If a departmental presentation scan is indicated the woman should be referred by an obstetrician or community midwife **post 36+weeks**.

- Establish fetal presentation and lie
- Fetal growth measurements should be performed if not already performed within the last 14 days and EFW plotted.
- Measure Liquor volume and assess placenta position

Report and follow up care

Cephalic

Complete ultrasound report and return to previous planned care pathway.

Breech, Transverse or Oblique

Confirm type of breech presentation.

This should be reported as extended breech, complete breech or footling breech.

Refer to the antenatal midwives/Clinic or MAU for an on-going management plan who will refer to Breech Clinic if appropriate.

Pelvic Survey

Scans to assess the potential for RPOC can only be requested by clinicians of ST5 and above.

- Assessment of the uterus to identify normal / abnormal uterine pathology
- Assessment of adnexal structures to identify normal / abnormal pelvic pathology
- Measure the maximum AP diameter of the endometrial cavity in longitudinal section
- Transvaginal scan may be required with woman's consent

Outcomes and reporting

The scan details will be reported on the CRIS system not ViewPoint.

If within 4 weeks of delivery – should go back to Maternity for review if symptomatic (ongoing bleeding/infection) and ET ≥ 20mm.

If >4 weeks of delivery and ongoing PVB and ET>20mm – advise GP to refer to GAU, LRI.

If post TOP /miscarriage – and PT positive >3/52 or ongoing PVB >3/52 or either of the above plus ET>20mm – advise GP to refer to GAU, LRI.

Quality assurance for the fetal anomaly screening programme

- In accordance with guidance in the FASP Handbook for Ultrasound Practitioners April 2015
- Registration with DQASS and a specified programme of training as detailed in the FASP Handbook for Ultrasound Practitioners 2015
- Quarterly image assessment by SSS and deputy SSSs of paired NT and CRL measurements and anomaly scan FASP images.
- Six monthly data reviews by DQASS
- Records to be kept of ultrasound machine service
- Key performance Indicators (KPIs)
  - FA4 – correct completion of the screening blood test form
  - FA2 – anomaly scan completed by 20+6 and any repeat scans by 22+6
  - FA3 – number of women who present for 1st trimester screening but are unable to have it performed
  - Quarterly reports produced for the FASP Quality Assurance team

Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Frequency
Key performance indicators for ANNB screening	NHS England and PHE QA teams will monitor through the ANNB screening programme boards	Quarterly
Monitoring of Trisomy screening standards	NHS England and PHE QA teams will monitor through the ANNB screening programme boards	Annually

Training Requirements and Education

All sonographers to undergo uterine artery Doppler training. Yearly GROW training.

References

1) Fetal anomaly screening programme: Handbook for ultrasound practitioners April 2015

2) Fetal anomaly screening programme: Programme handbook June 2018

3) Loughna P, Chitty L, Evans T and Chudleigh T - 'Fetal size and dating: charts recommended for clinical obstetric practice' Ultrasound (2008)

4) Saving Babies Lives version 2 published March 2019 NHS England

Keywords:
Amniotic bands, Amniotic fluid volume, Anomaly scan, Cervical length, Crown rump length, Dating scan, Multiple pregnancy, Nuchal translucency, Placental site assessment, Pregnancy, Scan, Screening, Uterine artery Doppler

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

DEVELOPMENT AND APPROVAL RECORD FOR THIS DOCUMENT		
Author / Lead Officer: Ian Scudamore, Fetal medicine consultant Hilary Brooke-Clarke, Advanced practitioner in ultrasound Claude Masakure, ultrasound clinical lead Helen Ulyett Screening co-ordinator, Marit Bodley Antenatal clinic manager		**Executive lead:** Chief medical officer
Reviewed by:	As above and fetal medicine/Obstetric team	
Approved by:	Guidelines Group Maternity Service Governance Group Imaging Ops Board	**Date Approved:** 19/03/2021 **V2.**1 20/10/2021

REVIEW RECORD			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
March 2021	V2	Ian Scudamore, Hilary Brooke-Clarke, Claude Masakure, Helen Ulyett and Marit Bodley	Rewrite of Ultrasound Guideline for Obstetrics (B52/2011) (2008) Technique for assessing liquor volume Management of demised Twin Confirmatory growth scan for late bookers >24 weeks Low lying placenta/placenta accretia FASP only 6 images to be stored and no annotation NT/CRL only one image of each to be stored Uterine Artery Dopplers at anomaly scan Scan pathway changes for GROW programme

October 2021	V2.1	Ian Scudamore & Helen Ulyett Approved at Maternity guidelines group & Womens Q&S board	Clarified that the anomaly scan must be completed when late bookers present, before 23+6/40. Updated restrictions applicable to Children accompanying parents to USS appointments. Re-formatted flow chart appendix 5

DISTRIBUTION RECORD:		
Date	**Name**	**Dept**
March 2021	All obstetric trained sonographers, ANC midwives, Fetal medicine consultants	Imaging and Maternity
November 2021	All obstetric trained sonographers, ANC midwives, Fetal medicine consultants	Imaging and Maternity

Appendices

Appendix 1. Radiology Results Sheets for Renal Tract Abnormality

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RADIOLOGY RESULTS SHEET FOR FETAL RENAL TRACT ABNORMALITY

MOTHER'S STICKER GP NAME& ADDRESS

1. **18- 20+6 week Fetal Anomaly Scan**

Rt Kidney Renal Pelvis AP diam, = mm Lt Kidney Renal Pelvis AP diam = mm

Bladder seen? Y/N Fetal sex: M F NS Amniotic Fluid Index = cm

Calyceal/ Ureteric Dilatation / Bladder Wall thickening/ Bladder enlarged/ Structural abnormality YES/NO

Renal Pelvis > 7mm or any of the above GO TO 2 – INFORM Fetal Medicine Team

2. **Antenatal Ultrasound with Fetal Diagnostic Team**

Rt Kidney Renal Pelvis AP diam = mm Lt Kidney Renal Pelvis AP diam = mm

Bladder Fetal Sex: M F NS Amniotic Fluid Index = cms

Calyceal/ Ureteric Dilatation / Bladder Wall thickening/ Bladder enlarged/ Structural abnormality YES/NO

Renal Pelvis > 10 mm or any of the above – Individualised management plan

Renal Pelvis < 10 mm - GO TO 3 unless other concerns require interim scans .

3. **32 week Antenatal Ultrasound**

Rt Kidney Renal Pelvis AP diam = mm Lt Kidney Renal Pelvis AP diam = mm

Bladder Fetal Sex M F Amniotic Fluid Index = cms

Calyceal / Ureteric dilatation / Bladder Wall thickening / Structural abnormality YES / NO

Renal Pelvis > 10mm or any of the above – Plan Postnatal follow up via Paed alert form. Paed to refer to *Neonatal Congenital Abnormalities of the Kidney and Renal Tract Guideline.*

Renal Pelvis < 10mm ---- DISCHARGE FROM CARE PATHWAY

NB . PLEASE LEAVE THIS FORM IN THE MATERNAL NOTES UNTIL DELIVERY, THEN THE PAEDIATRIC TEAM SHOULD ATTACH IT TO AN ULTRASOUND REQUEST FORM AND SEND TO THE XRAY DEPARTMENT

RADIOLOGY RESULTS SHEET FOR POST-NATAL RENAL TRACT ABNORMALITY

BABY STICKER SEX GP NAME AND ADDRESS

4. 1 week Post-natal Scan Result

Structural Abnormality Letter B to "Paeds Nephrology" LRI ----------Date
Arrange DMSA for single or multicystic dysplastic kidney ----------Date

Hydronephrosis (Renal pelvis > 10mm) Start Antibiotics---------- Arrange MCU ----------

Letter A to the family ---------- Date

Calycael / Ureteric dilatation / duplex / thick –walled bladder Letter B to "Paeds Nephrology" LRI ----------Date

Normal Repeat Ultrasound in 6 weeks ----------Date

5 6 week Post-natal Scan Result

Hydronephrosis (renal pelvis > 10mm) Start Antibiotics---------- Arrange MCU----------

Letter A to the family GP ---------- Date

Calycael / ureteric dilatation / duplex/ Thick-walled bladder Letter B to "Paeds Nephrology" LRI ---------- -Date

Normal Letter C and result sheet to "Paeds Nephrology" Paediatrics LRI ---------- Date

6. M.C.U. Result

Normal U/S Renal Pelvis > 15 mm Arrange MAG 3 ----------Date
U/S Renal Pelvis < 15 mm Letter D and result sheet to
"Paeds Nephrology" Paediatrics LRI _----------Date

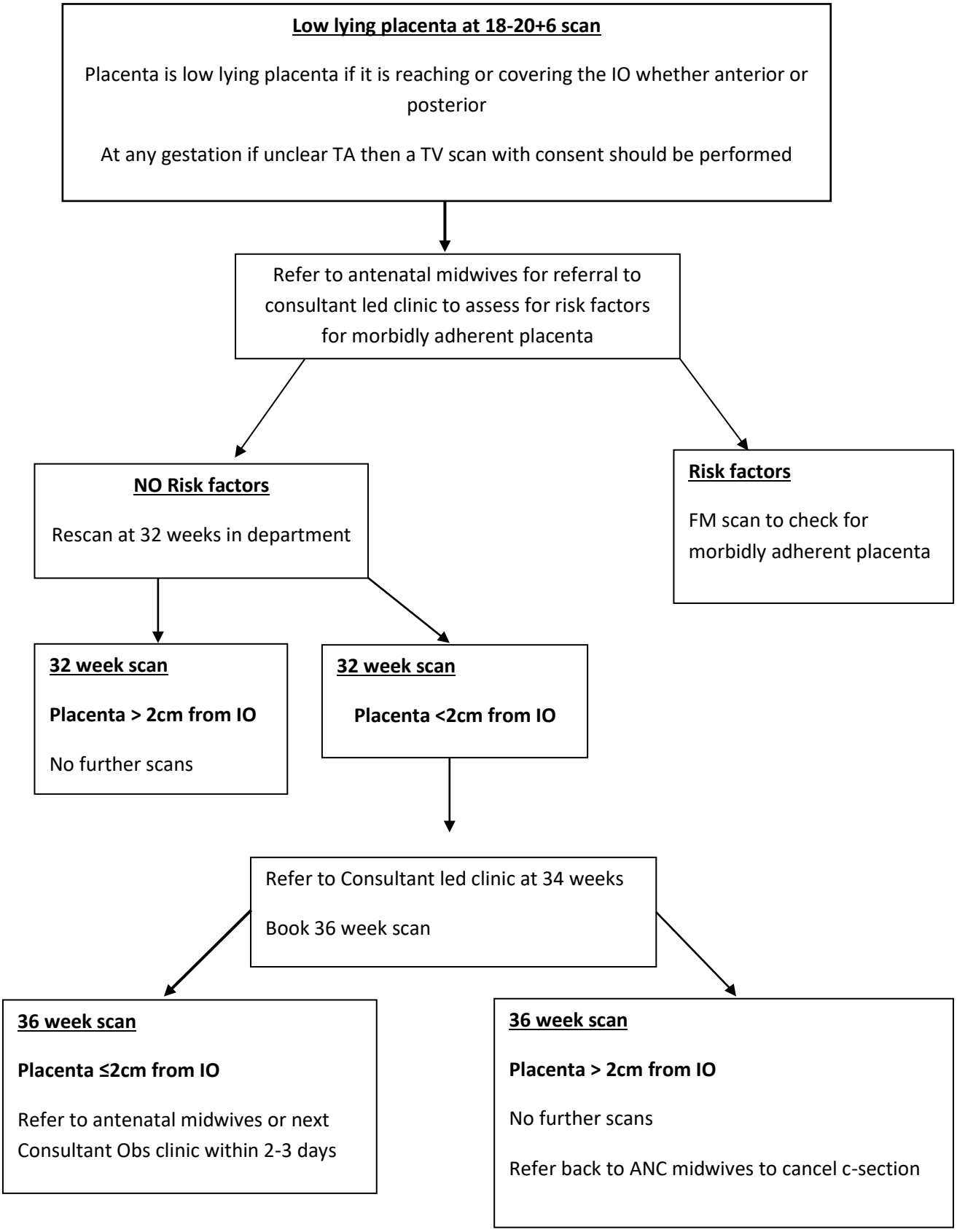
Reflux Letter D and Result sheet to "Paeds Nephrology" Paediatrics LRI ----------Date

7. MAG 3 Result

Letter D and Result sheet to "Paeds Nephrology" Paediatrics LRI ----------Date

N.B. PLEASE LEAVE THIS FORM IN THE MATERNAL NOTES UNTIL DELIVERY THEN – THE PAEDIATRIC TEAM SHOULD ATTACH IT TO AN ULTRASOUND REQUEST FORM AND SEND TO X-RAY

Appendix 2. Low Lying Placenta Pathway



Appendix 3. UHL Antenatal Polyhydramnios Flow Chart
Assessment of liquor volume

a. **Gestational age < 24 weeks gestation:**
   - **Do not measure unless liquor appears increased then use Deepest Vertical Pool (DVP).**
   - All cases DVP >8cm centile refer to fetal medicine consultant.
   - Midwife to organise GTT and infection screen (CMV, Toxo,Parvo).

b. **Gestational age ≥ 24 weeks:** Deepest vertical pool (DVP)and follow the following:

DVP > upper viewpoint centile but < 12cm

Ultrasound Practitioner to:

check Fetal lips/stomach/movements/Hydrops and record on the scan report – refer to Antenatal midwife

Antenatal midwife to:

Explain scan findings to the woman - any concerns arrange fetal medicine scan.

If <32 weeks – GTT & CMV/Toxo/Parvo

If>32 weeks – HbA1c & CMV/Toxo/Parvo

Follow up results of blood tests

Plan repeat growth and liquor scan at 36 weeks

36 week scan

DVP < 8cm

Discharge to Community Midwife

DVP ≥ 8cm

- Antenatal midwife to explain that the baby will be checked by the midwife after birth and will need stay in for 8 hours to monitor feeding
- Complete Paed alert stating polyhydramnios and refer to scan report. Attach a copy of the scan report.
- Complete Intrapartum care plan and file in notes

DVP ≥ 12cm (moderate/severe hydramnios)

Sonographer to:

check Fetal lips/stomach/movements/Hydrops and record on the scan report – refer to Antenatal midwife.

Antenatal midwife to:

Explain scan findings to the woman and perform HbA1c

CMV/Toxo/Parvo and follow up results

Arrange Fetal medicine scan.

Fetal medicine Consultant to:

- Check fetal anatomy
- Review HbA1c/CMV/Toxo results
- Consider red cell antibody
- Consider cervical length scans
- Plan Serial growth scans
- Assess premature labour risk and consider steroid treatment.
- Complete Intrapartum care plan.
- Complete Paed alert stating polyhydramnios, include any associated abnormalities & refer to the scan report. Attach a copy of the scan report.
- Explain possible need for NGT and chest x-ray after birth if antenatal scan findings suggestive of oesophageal atresia (OA) or other anomalies in the VACTERL group. Baby will need to stay in hospital for at least 8 hours under observation and to establish feeding. If baby develops respiratory difficulties then NGT will be inserted and CXR performed to investigate for possible OA.

There is insufficient evidence in the literature for induction of labour for mild/moderate polyhydramnios alone. However induction of labour is indicated when polyhydramnios is part of a clinical picture eg maternal diabetes or other obstetric conditions or reduced fetal movements.

Appendix 4. East Midlands Fetal Medicine Network Regional Guideline Diagnosis and management of abnormally invasive placentae

https://www.england.nhs.uk/midlands/wp-content/uploads/sites/46/2019/07/EM-AIP-pathway_Revision1_FINAL_May-19.pdf

Appendix 5 STANDARD OPERATING PROCEDURE (SOP)

TITLE: Standard operating procedure for Uterine Artery Doppler measurement between 20 and 23 weeks gestation for a singleton pregnancy

References to other standards and procedures:

UHL Trust -
Standard Operating Procedure for Managing Patients with either a Suspected or Confirmed Case of Coronavirus Disease 2019 (COVID-19)

APPROVERS	POSITION
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Senior Management Lead: Ian Scudamore	Clinical Director Consultant Obstetrician

NB: Paper copies of this document may not be most recent version. The definitive version is held on INsite Document. Once the SOP is obsolete ensure it is removed/archived.

Introduction and Background:
Uterine artery Dopplers should be performed for women identified as being at high risk for impaired fetal growth (Saving Babies Lives V2). If possible both Uterine Artery Doppler waveforms should be evaluated and used to establish the appropriate fetal surveillance pathway.
Procedure:
• Patient identified on antenatal record as High Risk for fetal growth restriction (see SBLV2 algorithm). • Perform uterine artery Doppler assessment during anomaly scan. • Identify longitudinal image of iliac vessels • Using colour imaging identify uterine artery as it crosses iliac vessels on medial aspect • Place gate for pulse wave Doppler over uterine artery trying to keep vessel vertical and incident beam directly down longitudinal axis of vessel.

Confirm pulsatile flow with wave-form consistent with uterine artery.
Apply auto-calculate to "frozen" wave-form. Manual tracing can also be used if necessary.

- Store image and save Doppler data
- If after 60 seconds a suitable vessel and image cannot be identified then cease attempt on that side
- Repeat for the contra-lateral uterine artery
- Send data to Viewpoint at completion of the scan

If there is at least one uterine vessel with a PI <1.5 then start serial growth scan schedule from 32 weeks gestation
If both uterine vessels have a PI of ≥1.5 then start serial growth scan schedule from 28 weeks gestation.

If only able to measure one uterine artery PI use the cut off PI of 1.5 as noted; PI < 1.5 scan from 32 weeks, PI ≥ 1.5 scan from 28 weeks.

If neither vessel is able to be evaluated then treat as High Risk and start serial growth scan schedule at 28 weeks gestation.

Do not book a repeat scan to complete the uterine artery Doppler assessment, however if you have been unable to evaluate the uterine artery Doppler this may be attempted again if a further anomaly scan is required to complete the anomaly scan.

Follow-up:

Dependant on findings as noted above.

Governance and Audit:

All incidents to be reported via Datix.

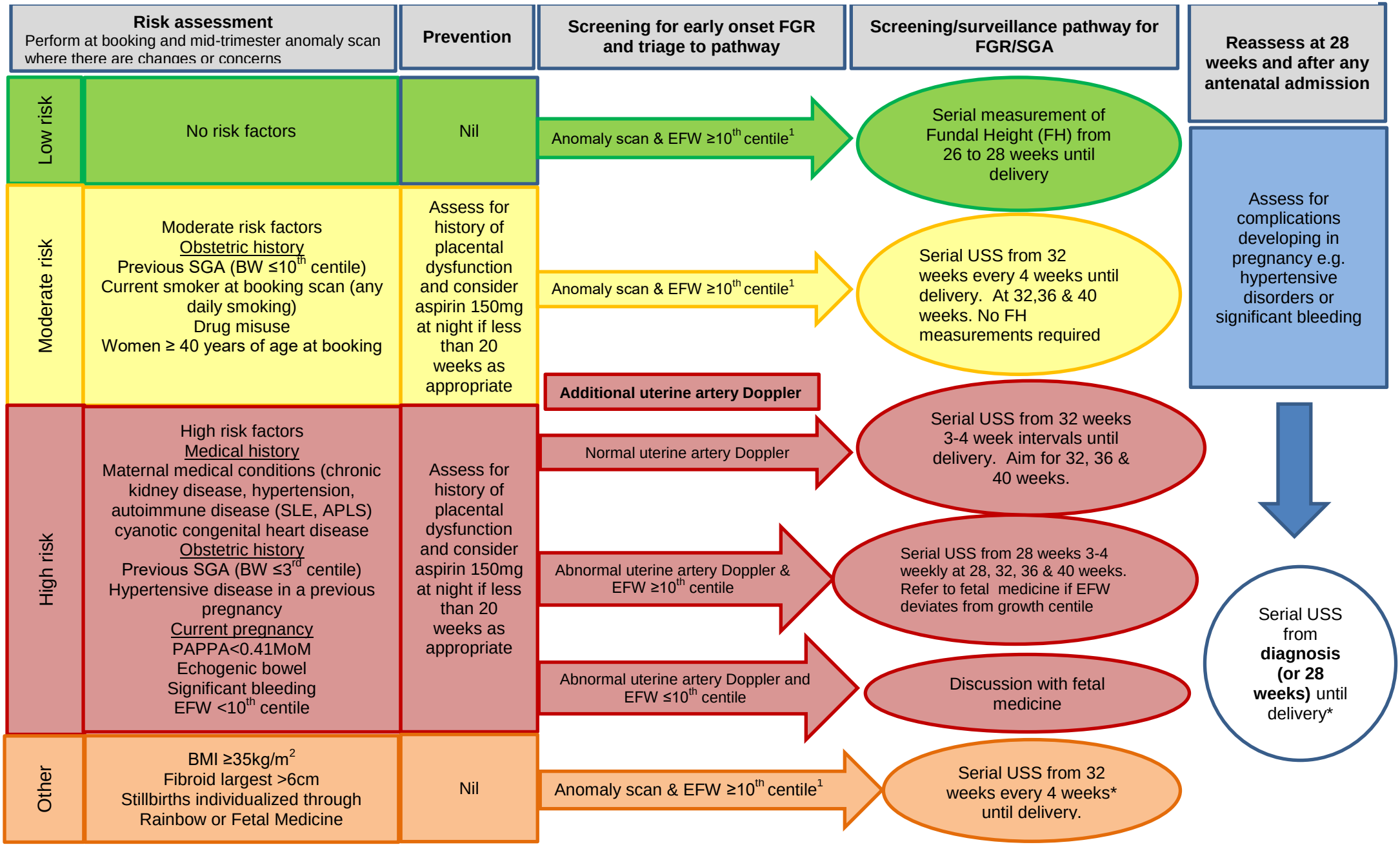
Training:

Staff trained prior to commencement of carrying out Doppler assessment of the uterine artery waveform.

Documentation:

Store image and save Doppler data

Appendix 6. Algorithm for using uterine artery Doppler as a screening tool for risk of early onset FGR in a singleton pregnancy



The risk factors listed here constitute those routinely assessed at booking, other risk factors exist and risk assessment must always be individualised taking into account previous medical and obstetric history and current pregnancy history. Where serial scanning is requested outside these guidelines please complete a scan request form to be reviewed prior to booking a scan. For women with maternal medical conditions and individuals with disease progression or institution of medical therapies may increase an individual's risk and necessitate monitoring with serial scanning. For women with a previous stillbirth, management must be tailored to the previous history i.e evidence of placental dysfunction or maternal medical conditions. Consider referral to Rainbow clinic. EFW <10th centile is a high risk factor. *Refer to risk assessment and screening section for advice on scan interval. Use the growth calculation after 34 weeks to confirm adequate increase in EFW if there appears to be a deviation in the growth centile. 10th centile at the screening for early onset FGR stage is based on the Viewpoint calculation. All women who have a fetus that plots on or below the 3rd centile should be referred to fetal medicine for review. Where a fetus plots below the 10th centile a scan should be re-booked in 2 weeks (minimum 14 days between scans)