

Uterine Artery Doppler Screening in High Risk Pregnancies

VERSION 2.1

Lead Person(s) : Adam Gornall
Care Group : Women and Children's
First implemented : February 2022
This version implemented : 16th July 2025
Planned Full Review : July 2027
Keywords : *Uterine Artery Doppler, fetal/intra-uterine growth restriction, small for gestational age UtAD, SGA, FGR, IUGR*
Updated by : Lindsey Reid, Lead Midwife for SBL
Jane Pennington, Sonographer
Consultation : Maternity Guideline Group
Maternity Governance
Comments : References to SaTH Guidelines in the text pertain to the latest version of the Guideline on the intranet. Printed copies may not be the most up to date version.

Version	Implementation Date	History	Ratified By	Review Date
1	April 2022	New Guideline	MGG and Maternity Governance	April 2027
1.1	18 th November 2022	Updated to align with SGA/Fetal surveillance guideline	Maternity Governance	April 2027
1.2	March 2023	Auditable standards added- Appendix 3		November 2025
1.3	April 2023	Amendments to pathway. Guideline archived 01/08/2023 (Replaced by 4017 Referral for Fetal Medicine Services) reinstated 05/06/2024	Maternity Governance	November 2025
2	19 th July 2024	Updated to align current RCOG guidance and SBLCBv3 (SOP v1.3 out of archive)	Maternity Governance	July 2027
2.1	16 th July 2025	Auditable Standards removed (Appendix 4)	Louise Weaver Clinical Audit Facilitator	July 2027

1.0 Introduction

In this guideline we use the terms 'woman' or 'mother' throughout. These should be taken to include people who do not identify as women but are pregnant or have given birth.

The uterine artery doppler (UtAD) scan is a screening test used to identify those babies that are at greater risk of not growing to their full potential/growth restricted. The UtAD measures the blood flow through the uterine arteries, the vessels that supply the uterus. An abnormal uterine artery doppler pulsatility index (PI) correlates with high resistance in the maternal arterial supply to the placental bed, secondary to poor trophoblast invasion and remodelling of the maternal spiral arteries (Ref 1). In the non-pregnant and early pregnancy states the resistance in the vessel is high but decreases as the pregnancy progresses. Persistent high resistance raises the chance of pre-eclampsia and intrauterine growth restriction (IUGR).

Small for gestational age (SGA) and fetal growth restriction (FGR) are not synonymous. Staff managing fetal growth problems should appreciate that SGA [estimated fetal weight (EFW) <10th centile] and FGR (where a fetus fails to reach its growth potential) are distinct entities. Although SGA babies are at increased risk of FGR compared to appropriately grown fetuses, fetuses <3rd centile are far more likely to be FGR than fetuses between 3rd – 10th centile (Ref 2).

In high-risk populations using uterine artery Doppler alongside maternal factors and fetal biometry at a mid trimester scan (19+0–24+6 weeks) has been shown to be able to detect 89% of very preterm SGA below the 5th centile (10% false positive rate before 32 weeks) with 77% detected with uterine artery Doppler alone (Ref 3).

All women should be assessed at booking for risk factors for an SGA fetus to identify those who require additional surveillance. Women who have one or more high risk factors (see Appendix 1) should be referred for uterine artery doppler screening at 20-20+6 weeks of gestation (UtAD can be assessed up to 23+6 weeks as part of routine screening).

2.0 Aim(s)

2.1 Identify singleton pregnancies at high risk of FGR based on the uterine artery doppler measurement at the fetal anomaly USS and thus initiate appropriate surveillance.

2.2 This guideline will advise how pregnancies at moderate and high risk of FGR should be monitored.

3.0 Objectives

3.1 To Identify those women with an abnormal UtAD measurement

3.2 Provide a clear management plan for ongoing assessment of these babies in line with SBLCB V2

4.0 Definitions and/or objectives

4.1 SGA – Small for gestational Age (10th-3rd centile)

4.2 FGR – Fetal Growth restriction (<3rd centile)

- 4.3 IUGR – Intrauterine Growth Restriction
- 4.3 UtAD - Uterine Artery doppler
- 4.6 EFW – Estimated Fetal Weight
- 4.7 USS – Ultrasound Scan
- 4.8 SBLCB V3 - Saving Babies Lives Care Bundle Version Three
- 4.9 SFH – Standardised Fundal Height

5.0 Process

At the booking appointment each woman will have a risk assessment by a booking midwife to identify those pregnancies at high risk of FGR (See appendix 1), this will be recorded on her Badgernet maternity notes. The risk assessment will be in keeping with SBLCB V3 (ref 2) as either low, moderate, or high risk.

Following the dating scan, women identified as being **high risk** will be referred for UtAD screening to be completed at the same time as their fetal anomaly ultrasound scan. This referral will be made by the midwife sonographer after completion of the dating scan based on the risk assigned to her as documented on her Badgernet notes. The women will be booked onto the UtAD screening anomaly scan list.

High Risk factors include:

High Risk Factors	<u>Medical History</u>
	<ul style="list-style-type: none"> Maternal medical conditions [chronic kidney disease, hypertension, autoimmune disease (SLE, APLS), cyanotic congenital heart disease]
	<u>Obstetric History</u>
	<ul style="list-style-type: none"> Previous FGR Hypertensive disease in a previous pregnancy Previous SGA stillbirth
	<u>Current Pregnancy</u>
	<ul style="list-style-type: none"> PAPP-A <5TH Fetal echogenic bowel Significant bleeding EFW <10TH from anomaly scan onwards

5.2 Results

A normal result = mean UtAD-PI <95th centile for gestational age (See Appendix 2, *Gomez et al*) (4).

Assign women a “positive” screen if they have the following:

- Mean uterine artery PI >95th centile for gestation (use Gomez chart; Appendix 2),
- EFW <10th centile.

If unable to obtain a UtAD measurement on both arteries, no further attempts will be made. The women will be offered serial growth scans from 26-28 weeks every 3 weeks.

Assign women a “negative” screen if **none** of the above features are present. These women should have a single SFH measurement at their routine antenatal check and

commence serial growth ultrasound assessments every 4 weeks from 32 weeks' gestation until delivery.

The assessment of uterine artery notching is **not** recommended as it is a qualitative assessment (ref 3).

NB The following women will commence serial growth scans from 26-28 weeks regardless of a negative screen

- severe pre-eclampsia
- pre-eclampsia that resulted in birth <34 weeks
- pre-eclampsia with a baby whose birth weight <10th customised centile
- intrauterine death (associated with pre-eclampsia)
- placental abruption (associated with pre-eclampsia)

refer to **Hypertensive Disorders of Pregnancy in the Antenatal, Intrapartum and Postnatal Period (Including Management of Severe Pre-Eclampsia and Eclampsia) Version 3 Trust** guideline for further guidance

5.3 Management (also see Appendix 3)

Women with a **normal** UtAD and **EFW >10th centile** (at anomaly scan) will be offered a single SFH measurement at their routine 28 week antenatal check and serial USS every 4 weeks from 32 weeks' gestation until delivery.

Women with a **normal** UtAD but **EFW <10th centile** (at anomaly scan) will be referred for serial USS from 26-27 weeks' gestation every 3 weeks until delivery.

Women with an **abnormal** UtAD and EFW >10th centile will be referred for serial USS from 26-27 weeks' gestation every 3 weeks until delivery.

Women with an **abnormal UtAD and EFW <3rd centile** will be discussed with the fetal medicine specialist (FMS) and an individualised care plan developed.

Late bookers with high risk factors (as per appendix 1) for FGR who have missed the screening window (18 – 23+6/40) should be booked for serial growth USS and umbilical artery doppler assessment every 3 weeks from 26-27 weeks.

6.0 Training

Midwife sonographers who currently complete the FASP scan will receive training in the measurement of UtAD. Competency will be assessed in house by a clinician experienced in performing UtAD's.

7.0 Method

Place the transducer in the lower lateral quadrant of the abdomen medial to the anterior superior iliac spine (ASIS). Angle the probe medially. Use colour flow doppler to identify the uterine artery as it courses anteriorly and appears to cross the external iliac vessels. Reduce the gate to 2.0mm if necessary, place the cursor 1cm downstream of the crossover, and apply PW.

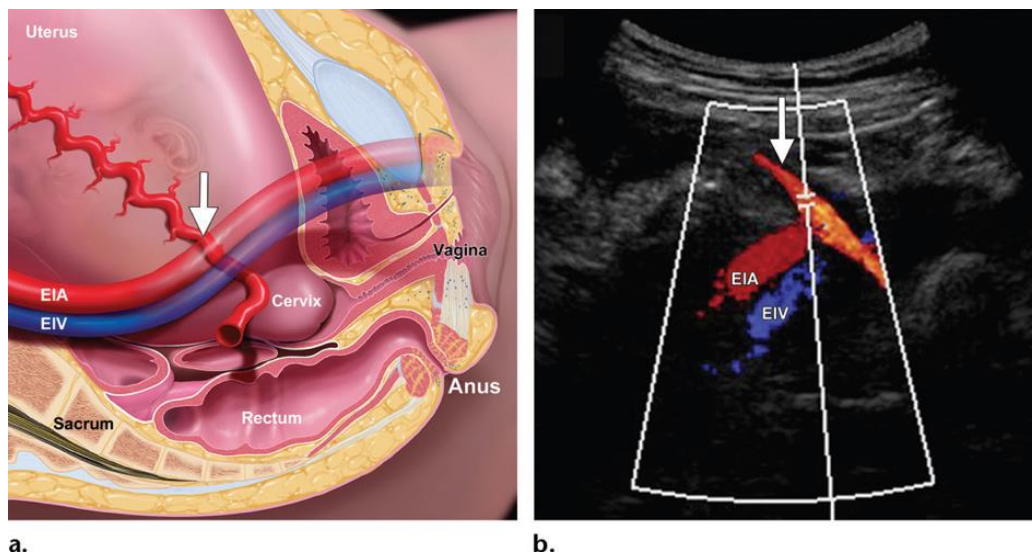


Figure 1. (a) Anatomical drawing of Uterine Artery at the cervicoisthmic junction. (b) Colour Doppler flow US image shows the sample volume placed in the uterine artery (5).

8.0 Monitoring/audit

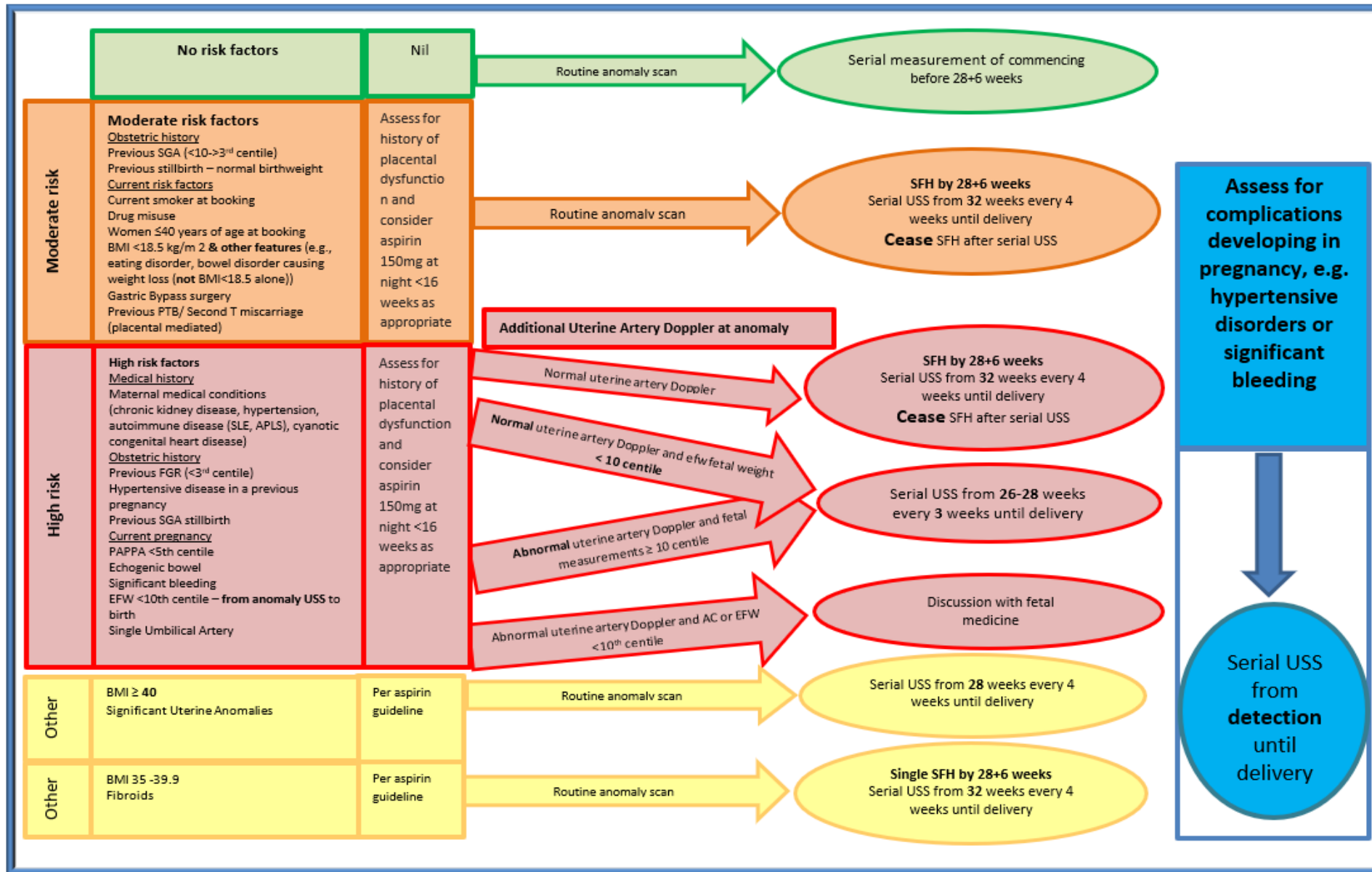
All women who are identified as high risk (as per appendix 2) are booked for UtAD screening at the fetal anomaly USS.

All “negative” screen women commence surveillance serial scans from 32 weeks’ gestation

9.0 References

1. Kumar B, Alfirevic Z editors. Fetal Medicine. 1st ed. Cambridge: Cambridge University Press; 2016.
2. NHS England (2023) Saving Babies’ Lives A care bundle for reducing perinatal mortality version 3
Available at [NHS England » Saving babies’ lives: version 3](#)
3. Small-for-Gestational-Age Fetus and a Growth Restricted Fetus, Investigation and Care (Green-top Guideline No. 31)
Available at: [Small-for-Gestational-Age Fetus and a Growth Restricted Fetus, Investigation and Care \(Green-top Guideline No. 31\) | RCOG](#)
4. Gomez, O (2008). Reference ranges for uterine artery mean pulsatility index at 11 – 41 weeks of gestation. Ultrasound Obstet Gynaecol, 32: 128 – 132. DOI:10.1002/uog.5315. Published online 6th May 2008.
5. Kennedy AM, Woodward PJ. A radiologist’s Guide to the performance and interpretation of Obstetric Dopplers. Radiographics. May-June 2019; 39:893-910.

Appendix 1 - Risk Assessment, Pathway and Management of FGR



NHS England (2023) Saving Babies' Lives A care bundle for reducing perinatal mortality version 3/RCOG Green-top no 31 (2024)

Appendix 2 – Reference Ranges for Uterine Artery Doppler Mean Pulsatility index at 11 – 41 weeks gestation.

<i>GA (weeks)</i>	<i>5th centile</i>	<i>50th centile</i>	<i>95th centile</i>
11	1.18	1.79	2.70
12	1.11	1.68	2.53
13	1.05	1.58	2.38
14	0.99	1.49	2.24
15	0.94	1.41	2.11
16	0.89	1.33	1.99
17	0.85	1.27	1.88
18	0.81	1.20	1.79
19	0.78	1.15	1.70
20	0.74	1.10	1.61
21	0.71	1.05	1.54
22	0.69	1.00	1.47
23	0.66	0.96	1.41
24	0.64	0.93	1.35
25	0.62	0.89	1.30
26	0.60	0.86	1.25
27	0.58	0.84	1.21
28	0.56	0.81	1.17
29	0.55	0.79	1.13
30	0.54	0.77	1.10
31	0.52	0.75	1.06
32	0.51	0.73	1.04
33	0.50	0.71	1.01
34	0.50	0.70	0.99
35	0.49	0.69	0.97
36	0.48	0.68	0.95
37	0.48	0.67	0.94
38	0.47	0.66	0.92
39	0.47	0.65	0.91
40	0.47	0.65	0.90
41	0.47	0.65	0.89

Gomez, O (2008). Reference ranges for uterine artery mean pulsatility index at 11 – 41 weeks of gestation. *Ultrasound Obstet Gynaecol*, 32: 128 – 132. DOI:10.1002/uog.5315. Published online 6th May 2008.

Appendix 3 – UtAD Screening Management Pathway

