Computerised CTG (cCTG)

Swansea Bay UHB

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Contents

Introduction

Computerised CTG (cCTG) is used for the monitoring of the fetal heart in the antenatal period, and in a systematic review showed a reduced perinatal mortality compared to non-computerised CTG. It uses the Dawes-Redman criteria (2002) to assess for normality. When criteria are met AND the cCTG visually looks normal then the chance of fetal hypoxia is low. However, the algorithm does not assess for other causes of fetal compromise such as infection, and so it is important that the cCTG is always interpreted with consideration to the clinical picture for that woman and baby. Even if the criteria are met but the cCTG look pathological, then consideration should be given to the value of continuing the pregnancy. cCTG does not replace the responsibility of the midwife and obstetrician to interpret the CTG but is an adjunct to support decision making.

The "Criteria"

cCTGs use the Dawes-Redman criteria to establish fetal well being. Whilst other cCTGs are gestation specific, the fetal wellbeing assessment (FWA) within K2 is NOT gestation specific and uses the expected values for 34/40 gestation. Therefore, clinicians will need to be aware and compare data to the gestation specific values outlined in section 4 (See interpretation of results).

The FWA assesses the following elements

Criteria	Description
Baseline	110-160 bpm
High Variation	Variability 5 or more bpm for a consecutive period of 5 out of 6 minutes.
STV (short term variability)	Only calculated after 60 minutes of CTG STV of 4ms or more for a consecutive period of 5 out of every 6 minutes for the duration of the assessment. If less than 4.5ms the long-term variability must be normal.
Accelerations	At least 3 accelerations (defined as 15bpm above baseline for at least 15 seconds) or one fetal movement. In the absence of accelerations fetal movements must be more than 20 per hour and have a normal long-term variability.
Decelerations	Absence of large or repeated decelerations (defined as decrease of 15bpm below the baseline for at least 15 seconds) Large decelerations are decelerations with the loss of 20 beats per minute or more. There must be no decelerations if the recording is less than 30 minutes, no more than 1 deceleration with 20-100 lost beats if the recording is more than 30 minutes. There must be no decelerations of more than 100 lost beats Emergent decelerations are identified against a non-fixed baseline (i.e. a provisional baseline) and thus may be recalculated or removed as new data is received. Fixed decelerations are identified once the baseline is considered stable and will not be re-calculated.
Fetal movements	Movements greater than or equal to 20 per hour. In the absence of fetal movements there must be 3 or more accelerations.
Signal Quality	Signal quality must be 80% or more
Sinusoidal	Any period of sinusoidal feature is considered negative.

Starting a cCTG / FWA

Computerised CTGs should be performed in all situations where there is an indication for CTG monitoring with the following exceptions:

- **Under 26/40 gestation**. cCTGs are only licensed to be used from 26+0
- **Presence of uterine activity** where there are contractions the cCTG analysis should not be undertaken. In latent phase an antenatal CTG should be performed without the computerised analysis.
- **Following administration of prostaglandins.** cCTGs should not be used following administration of propess, prostin or misoprostol.
- **Triplets or higher order pregnancies.** cCTGs can be used on singleton or twin pregnancies.

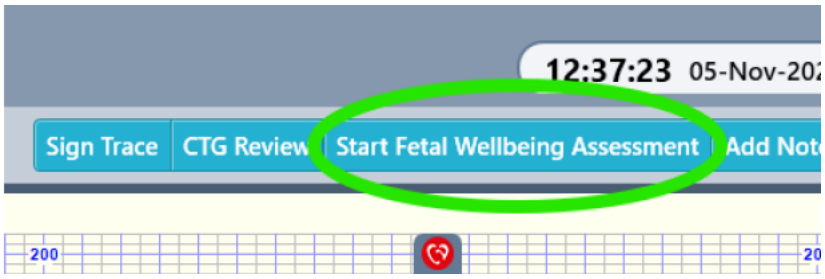
Within K2 there are 3 CTG functions / classifications

1) Antenatal Fetal Wellbeing Assessment (FWA). This is the cCTG that should be performed from 26 weeks gestation in the absence of uterine activity or administration of prostaglandins.
2) Antenatal CTG. This should be used from 26 weeks gestation where there is uterine activity or prostaglandins have been given.
3) Intrapartum CTG. This should be used from 26 weeks gestation during labour.

To start a Fetal Wellbeing Assessment:

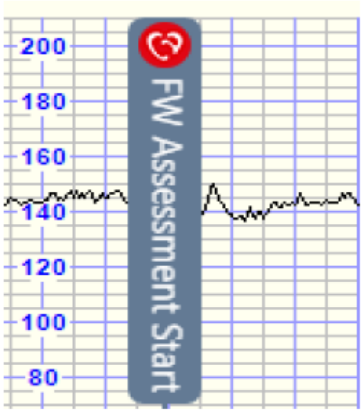
Ensure the patient has been admitted into the K2 portal and CTG started.

To start the review, select the “Fetal Wellbeing Assessment” in the top right corner of the K2 screen.

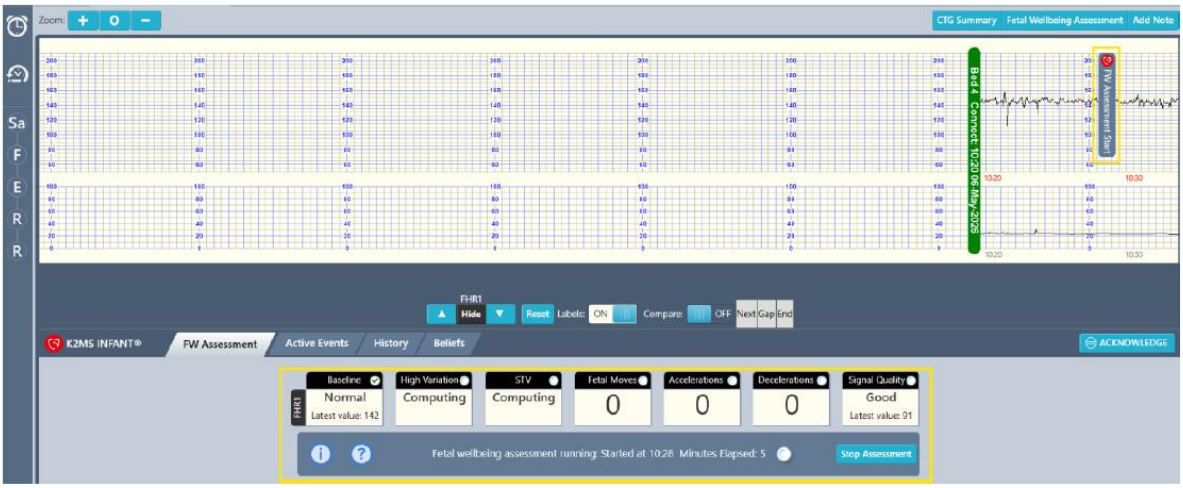


The screen will ask if you wish to continue the CTG for 60 minutes to calculate an STV. Please select NO. If you select yes, then the CTG will continue for 60 minutes irrespective of if the cCTG criteria are met.

A grey bar will appear in the CTG display showing where the FWA started. The assessment by the computer will then start after 10 minutes of CTG, every minute until either it is clear the criteria is met or not met, or 60 minutes has elapsed.



Whilst the CTG is being analysed a FWA progression panel will appear below the CTG.



Within each element of the progress bar a circle next to the name of the criteria will show:

- A spinning ring: assessment is ongoing and there is not enough information to currently pass or fail this element
- Green tick: the element has currently satisfied the criteria to pass. This may subsequently change if the criteria are no longer met as the assessment continues.
- Red cross: the element has failed to meet (for example 2 or more large decelerations). As it is clear the criteria will not meet the assessment will stop at this point.
- Dash: this element has neither passed nor failed. This will only appear once the assessment has finished.

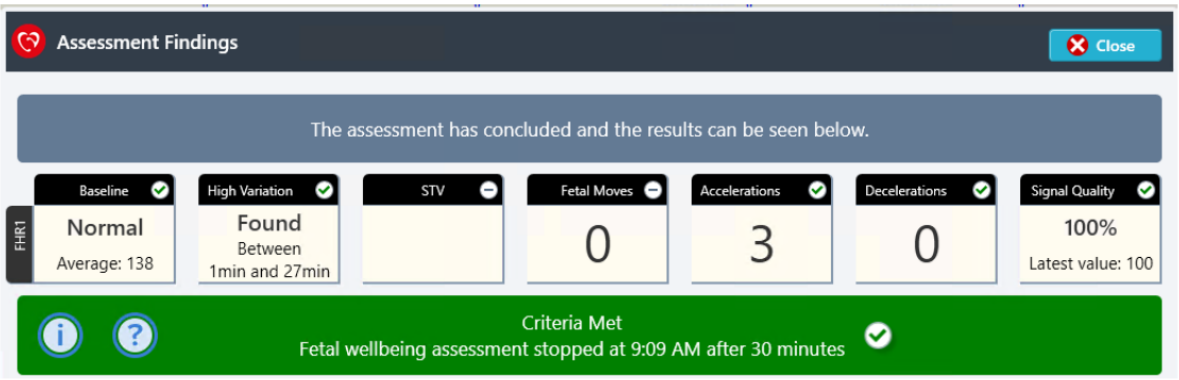
The bar will show how long the FWA has been running. There is also a button to stop the assessment

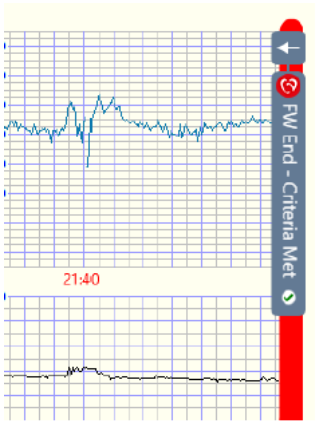
Results and management

Remember that the FWA does not replace your clinical judgement. If you believe the CTG is abnormal then you should act accordingly and escalate for an obstetric review EVEN IF the FWA has not completed its analysis. Do not delay management of an abnormal CTG to wait for the FWA report.

Criteria Met

Once the criteria has met the FWA will stop. The grey progress bar will turn green. A bar will be placed on the CTG showing where the criteria was met and FWA stopped.





If you agree that the CTG looks normal, then the CTG can be stopped. Complete your assessment of the CTG as normal by completing the CTG review button

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If you wish more CTG then continue the CTG until either you do agree it looks normal (then follow above actions), or you believe it is abnormal (see below).

If you disagree with FWA and believe that the CTG is abnormal then continue the CTG and request an obstetric review.

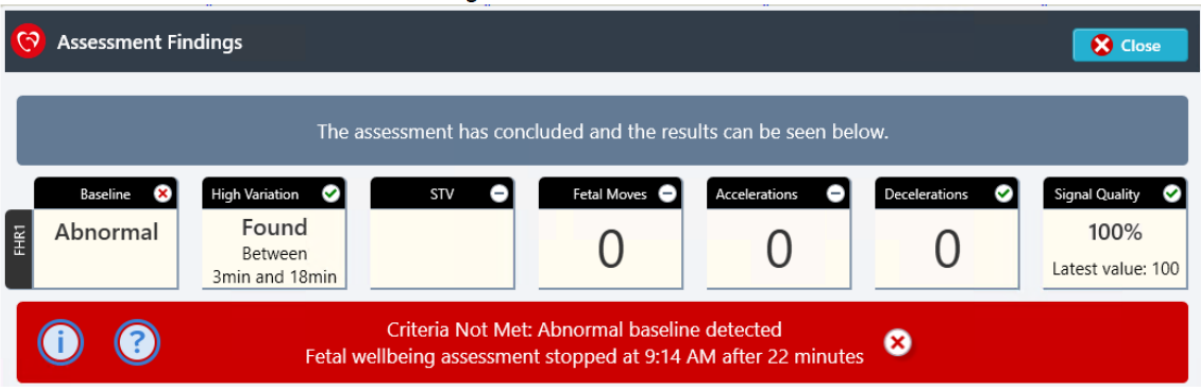
Criteria not met

When the criteria are not met then the management is less clear and it becomes more important to look at why the CTG did not meet the criteria, within the clinical picture for that woman and her baby. It becomes the responsibility of the senior obstetric team to decide on the significance of the cCTG and, in discussion with the woman, recommend a management plan.

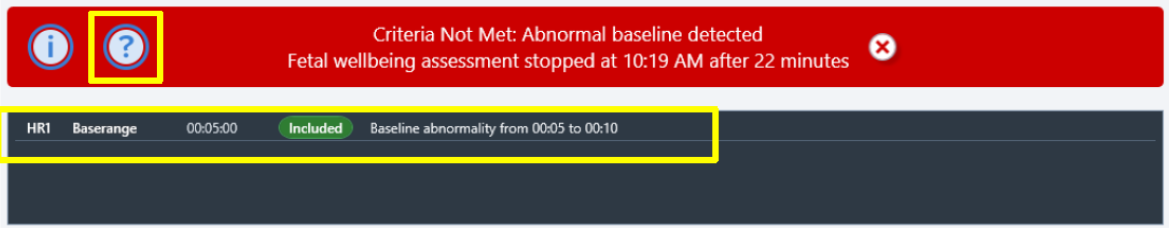
A cCTG that does NOT meet the criteria should always be considered an abnormal CTG and not be discontinued until a management plan has been agreed. The following is a suggestion for how to approach the management.

Criteria not met less than 60 minutes

Different to previous cCTG packages, the FWA may not meet the criteria before 60 minutes because the criteria will never meet and it needs no more information to make that decision. Unfortunately, this means that no STV value will be given. The progress bar will turn red and identify why the criteria is not met.

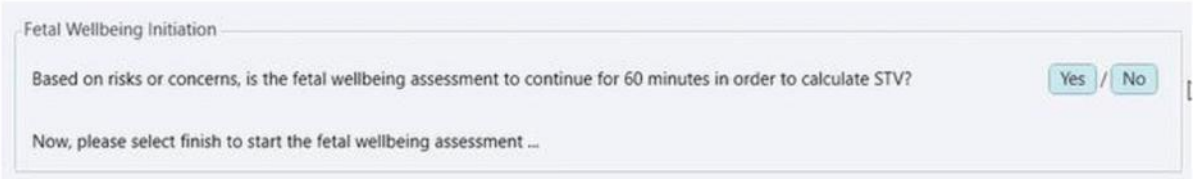


Further information can also be obtained by pressing the question mark icon on the progress bar which will then display an additional list showing the abnormal features.



If you agree that the CTG is abnormal then continue the CTG and escalate for obstetric review. Complete your interpretation on the CTG summary as normal.

If you disagree and believe the CTG looks normal, then restart the FWA but when asked if you wish the CTG to continue for 60 minutes to obtain an STV PRESS YES. Remember that the patient will be on CTG for another 60 minutes so offer a brief comfort break to empty her bladder if needed before restarting the FWA.



At the end of 60 minutes then an FWA will either have met criteria or not met criteria, but there will also be an STV value. For ongoing management see the criteria met, or criteria not met after 60 minutes sections.

***PLEASE NOTE**: If your CTG Summary classifies as normal & the FWA has 'not met' due to LOC or suspected (but not visualised) decelerations, a 60-minute FWA for an STV is not required, provided the clinical rationale is clearly documented with a normal CTG & overall clinical picture.*

Criteria not met after 60 minutes

The progress bar will turn red and identify which elements have not met criteria as above. However, because the FWA has lasted 60 minutes there will also be an STV value. Remember that this will not be gestation specific, and therefore where the STV has not met criteria then comparison should be made with the gestation specific values.

Gestation	≤ 28+6	29 - 31+6	32 - 33+6	≥ 34
Normal stv	≥ 2.6	≥ 3.0	≥ 3.5	≥ 4.5

Complete your own interpretation using the CTG summary function as normal. If you believe the CTG is abnormal then continue the CTG and escalate for obstetric review.

If the STV is the ONLY criteria not met, and by the above chart the STV is normal for gestation, and your interpretation of the CTG is normal, then you can consider the criteria met, discontinue the CTG and complete your CTG summary explaining that the STV is normal for gestation. No further action is then required.

If there are other reasons why the FWA has not met criteria then escalate for obstetric review.

Obstetric review

As with all CTGs complete your own assessment considering the wider clinical picture. If you agree that the CTG is abnormal then consideration should be given to expediting birth. In preterm gestations then this decision should be agreed by a consultant.
If your interpretation is a normal CTG then look at the reasons why the criteria was not met. The following may be given as reasons:

- Baseline rate: The FIGO and NICE guidelines agree that a normal baseline fetal heart rate for a term fetus is 110 – 160 beats per minute. Baseline FH Rates must be assessed in consideration of expected baseline for a fetus of the gestation being monitored. The Dawes/ Redman analyses the intervals between beats and converts into a Basal Heart Rate. Basal rate is not the same as baseline rate and may deviate significantly from a visual assessment of baseline rate. Reasons for a higher than expected basal rate include maternal conditions such as sepsis, dehydration, DKA. And reasons for a lower than expected basal rate include opiate usage.
- Decelerations: These will be unprovoked decelerations. Immediate intervention if the trace is otherwise abnormal, or significant clinical concerns. Isolated decelerations may occur especially in very early gestations or oligohydramnios. Repetitive decelerations are more concerning.
- No episodes of high variation: Long Term Variation (LTV) is essentially equivalent to traditional baseline variability. Measured over 1-minute, the difference between the high and low FH values is analysed. Important evidence of normality is the episodic variation in the baseline heart rate. LTV is reported as “High” or “Low” episodes. In deep sleep the fetal heart rate is relatively constant with lower short-term variation, but this should not normally exceed 50 minutes.
- No fetal movements / fewer than 3 accelerations: Ensure the woman understands to use the event marker with fetal movements, and that the event marker is plugged in. If the woman has not felt any fetal movements AND there are no accelerations, then this is more concerning.
- Low STV: Short-term variation (STV) is a computerised measure of the micro fluctuations of the fetal heart. These are not visible to the human eye. A low value (see gestation specific chart) is strongly linked to the development of metabolic acidaemia and impending intrauterine death (risk 24%), especially if also with the absence of high variation. STV can only be analysed after a full 60 minutes.

- Suspected sinusoidal pattern: Sinusoidal FHR patterns are associated with either severe fetal anaemia or severe/prolonged fetal hypoxia with acidosis and are associated with poor fetal outcomes. Often associated with reduced fetal movements, true sinusoidal will last more than 30 minutes, whereas pseudosinusodial (believed to be associated with fetal sucking behaviour) lasts less than 30 minutes and has normal CTG before and after, as well as normal fetal movements reported.

As with any CTG consideration should always be given to the whole clinical picture and not acted upon in isolation. Even with a cCTG that does not meet criteria expediting birth may not be in the best interest of the woman and fetus, especially in premature gestations. The rationale for not expediting birth in the presence of a cCTG that does not meet criteria should be clearly documented in the maternal records and a plan for future monitoring made. Where the cCTG looks normal and there are no immediate concerns about fetal or maternal wellbeing then repeating the cCTG after 2-4 hours can be considered. Where cCTG's repeatedly do not meet the criteria then a review should be undertaken by the obstetric consultant, to ensure senior level decision making regarding plan of care.

Twins

FWA can be run with twins, and both CTGs must meet criteria before the FWA will finish as met criteria. Each CTG should be interpreted in its own right as above for a singleton. Both fetal heart rate channels will be displayed in the progress bar:

Other ways of reading the report

The results of FWAs can also be seen in the Assessment tab

History of Fetal Wellbeing Assessments

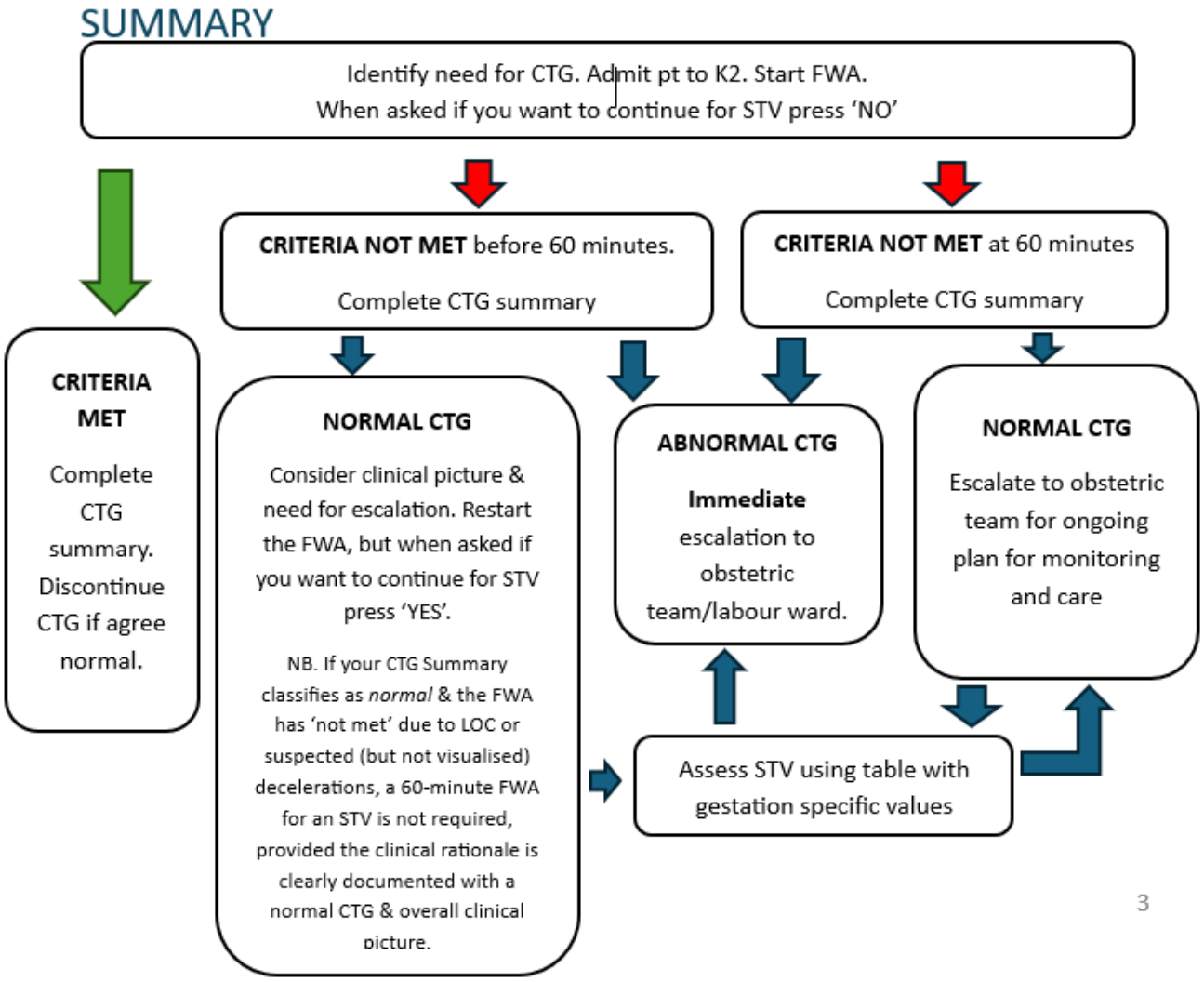
Displaying all Fetal Wellbeing Assessments started during this visit/admittance...

Time Started	Time Ended	Findings	Comment
▷ 11:58 25-Mar-2025	12:41 25-Mar-2025 36 elapsed mins	Criteria Cannot Be Met	Assessment Completed

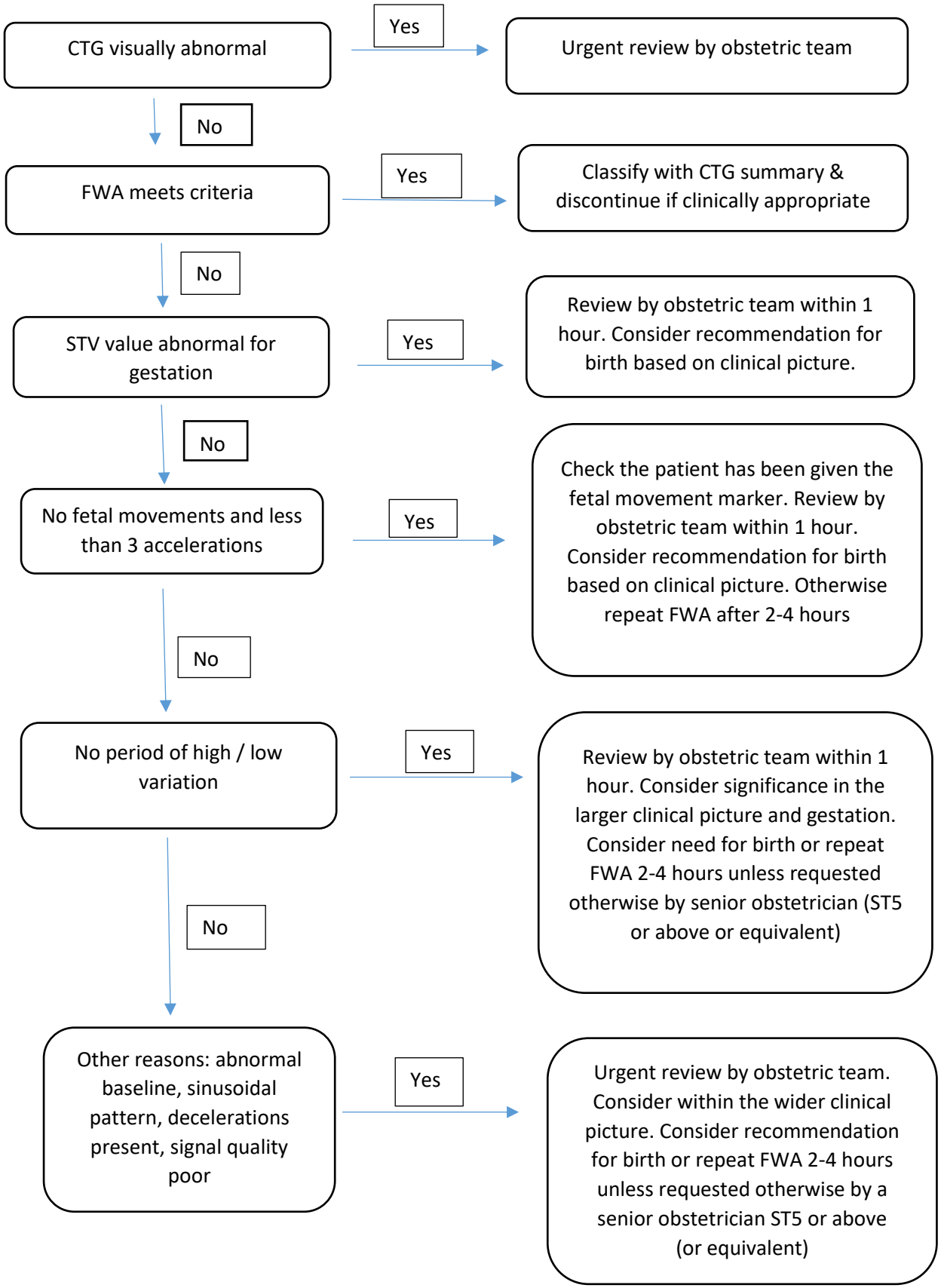
Fetal Wellbeing Assessment

Gestation Indicator Flag	**32 Weeks or Greater**
60 minute Assessment Required	**Yes**
Assessment Start Time	**25-Mar-2025 11:58**
Assessment End Time	**25-Mar-2025 12:41**
Duration	**36 mins**
Baseline criteria	**Passed {FHR1 138 bpm}**
Sinusoidal criteria	**Unsure**
Variability criteria	**Passed {FHR1 6 bpm}**
Short Term Variability criteria	**Assessment less than 60 minutes**
Accelerations criteria	**Passed**
Decelerations criteria	**Unsure**
Fetal Movement criteria	**Unsure**
Signal Quality criteria	**Failed {FHR1 62 %}**
Fetal Wellbeing Assessment Outcome	**Criteria Cannot Be Met**

Appendix 1 – Starting a FWA and initial assessment



Appendix 2: Further Analysis when criteria not met and Management recommendations



Maternity Services

Checklist for Clinical Guidelines being submitted for Approval

Title of Guideline:	Computerise CTG
Name(s) of Author:	Dr Louise-Emma Shaw, Catrin Elis
Chair of Group or Committee supporting submission:	Antenatal Forum
Issue / Version No:	2
Next Review / Guideline Expiry:	July 2029
Details of persons included in consultation process:	All midwives and obstetric consultations
Name of Pharmacist (mandatory if drugs involved):	n/a
Please list any policies/guidelines this document will supercede:	n/a
Keywords linked to document:	CTG, fetal heart, fetal wellbeing assessment
File Name: Used to locate where file is stores on hard drive	WISDOM