Reference Number: UHBOBS205 **Version Number: 3**	**Date of Next Review: 17 / 04 / 2029** **Previous Trust/LHB Reference Number:**

Dawes Redman Antenatal Computerised CTG Analysis

Introduction and Aim

To assist midwives and obstetricians in the interpretation of antenatal Cardiotocograph (CTG). This includes understanding the situations where computerised CTG (cCTG) is indicated and how to interpret the Dawes/Redman Criteria.

Objectives

The aim of antenatal fetal surveillance is to identify fetuses at risk of intrauterine hypoxia and acidaemia. Timely, appropriate intervention will avoid fetal neurological damage or death.

CTG is the most commonly adopted tool for antenatal fetal assessment. It should not be used in isolation.

There is no clear evidence that antenatal CTG improves perinatal outcomes or caesarean section rates. However, a comparison of cCTG versus traditional CTG showed a significant reduction in perinatal mortality with cCTG. (Cochrane review, 2015)

CTG interpretation must be used within the context of the clinical situation.

Equality Health Impact Assessment	*An Equality Health Impact Assessment (EHIA) has not been completed.*
Documents to read alongside this Procedure	*Fetal Surveillance Guideline*
Approved by	*Maternity Professional Forum and Obstetrics & Gynaecology Quality & Safety*

Accountable Executive or Clinical Board Director	Abigail Holmes (Director of Midwifery)
Author(s)	Stacey McCormack (Fetal Surveillance Lead Midwife)

Disclaimer

If the review date of this document has passed, please ensure that the version you are using is the most up to date either by contacting the document author or the Governance Directorate.

Summary of reviews/amendments

Version Number	Date of Review Approved	Date Published	Summary of Amendments
2			*Band 7 as well as senior obstetrician can sign off CTG when criteria not met. Dawes-Redman not to be used in the presence of uterine activity.*
3			*Insertion of gestation-specific thresholds for STV to align with RCOG SGA guidance.*

1 Table of Contents

Contents

1 Table of Contents ***3***

2 Aim/Purpose of this Guideline ***4***

3 Definition and Background ***5***

4 COMPUTERISED CTG (cCTG) ***5***

4.1 ELIGIBILITY FOR CTG **5**

4.2 EQUIPMENT **6**

4.3 SETTING UP THE MONITOR **6**

4.4 DURATION OF MONITORING **6**

4.5 DOCUMENTATION FOR cCTG **7**

4.6 STORAGE OF CTG's **7**

5 ABNORMAL CTG ***8***

6 RESULTS *Error! Bookmark not defined.*

6.1 Criteria met **9**

6.2 Criteria NOT met **9**

6.3 Reasons for not meeting the criteria (see appendix 1) **10**

6.4 Summary of Actions Following cCTG **11**

6.4.1 CRITERIA MET 11

6.4.2 CRITERIA NOT MET BEFORE 60 MINUTES 11

6.4.3 CRITERIA NOT MET AFTER 60 MINUTES OF ANALYSIS 11

7 Reasons for Not Meeting Dawes-Redman Criteria and Actions ***12***

7.1 Basal Heart Rate outside normal range **12**

7.2 Large decelerations **12**

7.3 No episodes of high variation **13**

7.4 No movements and fewer than 3 accelerations **13**

7.5 Baseline fitting is uncertain **13**

7.6 Short-term variation (STV) is less than 3ms Error! Bookmark not defined.

7.7 Possible error at end of the record **13**

7.8 Deceleration at the end of the record **14**

7.9 High frequency sinusoidal rhythm ____ **14**

7.10 Suspected sinusoidal rhythm ____ **14**

7.11 Long-term variation in high episodes below acceptable level ____ **15**

7.12 No accelerations ____ **15**

8 Reference ____ ***15***

2 Aim of this Guideline

To assist midwives and obstetricians in the interpretation of antenatal Cardiotocograph (CTG). This includes understanding the situations where computerised CTG (cCTG) is indicated and how to interpret the Dawes/Redman Criteria.

Back to Contents

3 Definition and Background

The aim of antenatal fetal surveillance is to identify fetuses at risk of intrauterine hypoxia and acidaemia. Timely, appropriate intervention will avoid fetal neurological damage or death.

CTG is the most commonly adopted tool for antenatal fetal assessment. It should not be used in isolation.

There is no clear evidence that antenatal CTG improves perinatal outcomes or caesarean section rates. However, a comparison of cCTG versus traditional CTG showed a significant reduction in perinatal mortality with cCTG. (Cochrane review, 2015).

CTG interpretation must be used within the context of the clinical situation.

Back to Contents

4 COMPUTERISED CTG (cCTG)

cCTG provides objective CTG interpretation. It allows communication of

robust, numeric facts instead of opinion.

The Dawes/Redman analysis has a database of 100,000 traces; by using this vast numeric data and relating it to outcomes, it acts as an expert assistant for CTG interpretation and accurate interpretation criteria.

The final clinical judgement should be based on the entire clinical assessment with cCTG forming part of this holistic approach to pregnancy management.

Back to Contents

4.1 ELIGIBILITY FOR CTG

Dawes/Redman Criteria is NOT appropriate for intrapartum fetal monitoring. It must be discontinued in the presence of uterine activity.

cCTG should only be performed in the antenatal period for fetal surveillance as per clinical indications.

Dawes/Redman criteria should not be used during induction of labour in the presence of uterine activity.

Dawes/Redman criteria can be used for a fetal gestation of 26^{+0} onwards until the woman is in labour. Prior to that gestation, auscultation with a Pinard Stethoscope or Sonicaid is appropriate.

4.2 EQUIPMENT

Only Huntleigh Sonicaid Team3 provide Dawes-Redman analysis.

4.3 SETTING UP THE MONITOR

The fetal heart must be auscultated with a Pinard Stethoscope or sonicaid before commencing the cCTG and documented.

Turn on the machine by touching the on/off switch for 3 seconds (front, upper right of machine)

Position the toco and ultrasound transducers.

Connect the fetal event marker and show the patient how to use it.

Input patient name, hospital number and EDD (from scan), gestational age. DO NOT use LMP. Analysis is now ready to start. Ensure maternal pulse is recorded. Ensure date and time is correct and sign cCTG.
NOTE the analysis will not start unless the gestation is entered.

Back to Contents

4.4 DURATION OF MONITORING

The maximum record length is 60 minutes for Dawes Redman analysis at this point criteria is either *Met* or *Not Met*. If the criteria is met and a normal antenatal CTG is confirmed, the cCTG can be removed. If it is not met the

trace must continue until you have sought Delivery Suite Band 7 or Senior Registrar and above review.

The computer analyses the CTG data and compares it with the

Dawes/Redman criteria at 10 minutes and every 2 minutes thereafter.

The practitioner commencing the CTG MUST ensure the quality of the cCTG is adequate

4.5 DOCUMENTATION FOR cCTG

Rationale for antenatal CTG should be documented in maternal notes.

At the start of the CTG, enter the woman's name and hospital number (use patient identification sticker) and legible name, designation and signature of the midwife (use printed stamp for clarity)

Add the Maternal pulse at the start of the CTG.

Confirmation that the date and time on the CTG is correctly set and signed by the midwife.

Confirmation that the monitor is set to run at 1cm per minute.

Any event, review or action related to the CTG will be entered on the trace with a legible name, signature and designation.

At the end of the CTG, the above classification is documented with the date, time and legible staff name, signature, and designation.

Back to Contents

4.6 STORAGE OF CTG's

Antenatal CTG paper print outs must be stored in the CTG envelope in the patient's record. The envelope must be identified with the patient's name, and hospital number; include the date and reason for CTG.

5 ABNORMAL CTG

If the CTG is suspected to be abnormal at any point, an immediate Delivery Suite Band 7 or Senior Registrar and above review **MUST** be sought using the appropriate SBAR escalation protocol.

Whenever the CTG is reviewed during the analysis, the practitioner must sign/annotate to evidence and document in the notes.

Back to Contents

6 RESULTS

6.1 Criteria met

If the CTG meets the Dawes/Redman criteria, this is a normal result.

Unless there are other clinical concerns, the analysis can be stopped and a report of the analysis is printed.

This criteria can be achieved as early as 10 minutes. The CTG does not need to be continued if a normal antenatal CTG is established and there are no clinical concerns.

DO NOT rely on STV values if cCTG has been on for less than 1 hour

The practitioner who stops the CTG must sign the CTG at the end of the printout and include a visual assessment, to confirm that the CTG is normal. If at any point the practitioner disagrees with the outcome on the printout this must be escalated to a Delivery Suite Band 7 or Senior Registrar and above.

The cCTG must then be filed in the patients notes.

6.2 Criteria NOT met

The CTG must continue for the FULL 60 minutes.

If it the criteria is still not met at 60 minutes, the computer will end the analysis, but the trace will continue and print the results on the trace. The reasons why the criteria were not met are highlighted as coded numbers.

Back to Contents

Continue the cCTG until the case is reviewed by a Delivery Suite Band 7 or Senior Registrar and above and action taken, based on the reasons for "Criteria not met", visual trace review and a holistic assessment of the pregnancy.

6.1 Reasons for not meeting the criteria (see appendix 1)

Code

1	Basal Heart Rate outside normal range
2	Large decelerations
3	No episodes of high variation
4	No movements and fewer than 3 accelerations
5	Baseline fitting is uncertain
6	Short-term variation (STV) is less than 3ms
7	Possible error at the end of the record
8	Deceleration at the end of the record
9	High frequency sinusoidal rhythm
10	Suspected sinusoidal rhythm
11	Long-term variation (LTV) in high episodes below acceptable level
12	No accelerations

Back to Contents

6.2 Summary of Actions Following cCTG

6.2.1 CRITERIA MET

- Visually review and classify the cCTG. If this is normal and there are no ongoing clinical concerns the analysis can be **stopped.**
- This can be with as little as **10 minutes** recording time. The printer will produce a report of the analysis results
- **DO NOT** review the numeric data as the cCTG has been classified as normal and this data is therefore insignificant

6.2.2 CRITERIA NOT MET BEFORE 60 MINUTES

- Unless there are clear abnormal features or any cause for concern continue the recording until the criteria are met.
- Short term variation (STV) is uninterpretable prior to 60 minutes; **DO NOT** review the numeric data.
- **DO NOT** prematurely stop the recording. If the analysis has been stopped before criteria are met and before 60 minutes, it is not valid.

6.2.3 CRITERIA NOT MET AFTER 60 MINUTES OF ANALYSIS

- Indicates that normality has not been demonstrated
- In the context of an antenatal CTG classification this is an abnormal outcome
- The case must be reviewed by a Delivery Suite Band 7 or Senior Obstetric Registrar or above and action taken based on the reasons for failure, visual trace review and a holistic assessment of the pregnancy
- STV cannot be assessed visually it can only be calculated following 60 minutes of analysis.
- The STV should be considered but **MUST NOT** be used in isolation as an indicator of fetal condition.

Back to Contents

The fetal heart rate STV is a biophysical parameter obtained by cCTG. It reflects autonomic nervous system function and in the context of fetuses with FGR can reflect changes in autonomic activity induced by hypoxia; this has been validated with invasive testing demonstrating fetal hypoxaemia and acidaemia.
The STV is gestation specific:

Gestation	≤28+6	29-31+6	32-33+6	≥34
Abnormal STV	<2.6ms	<3.0ms	<3.5ms	<4.5ms

7 Reasons for Not Meeting Dawes-Redman Criteria and Actions

7.1 Basal Heart Rate outside normal range

Baseline FH Rates must be assessed in consideration of expected baseline for a fetus of the gestation being monitored. Also consider the baseline in relation to the baseline on any previous CTG.

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 slightly from a visual assessment of baseline rate.

7.2 Large decelerations

These will be unprovoked decelerations. Review by Delivery Suite Band 7 or Senior Registrar and above. Immediate intervention if the trace is otherwise abnormal, or significant clinical concerns.

If the trace is otherwise normal and there are no clinical concerns, the CTG should be repeated later, as per Delivery Suite Band 7 or Senior Registrar and above management plan.

Back to Contents

7.3 No episodes of high variation

Long Term Variation (LTV) is essentially equivalent to traditional baseline variability.

Measured over a 1-minute sample, 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.

Back to Contents

7.4 No movements and fewer than 3 accelerations

This is significant and requires review by the Delivery Suite Band 7 or Senior Registrar and above.

Back to Contents

7.5 Baseline fitting is uncertain

If all else is normal and the baseline falls within normal parameters, then this can be ignored.

Back to Contents

7.6 Possible error at end of the record

This occurs when the machine detects a possible abnormality at the end of the trace which would otherwise be passed as CRITERIA MET.

In this event the trace may be continued or, if the clinical evaluation is that it is significantly abnormal, for example prolonged deceleration, then action should be taken as appropriate. Review by Delivery Suite Band 7 or Senior Registrar and above.

Back to Contents

7.7 Deceleration at the end of the record

In this event the trace should be continued and action taken as appropriate.

Review by Delivery Suite Band 7 or Senior Registrar and above.

Back to Contents

7.8 High frequency sinusoidal rhythm

Sinusoidal FHR patterns are associated with either severe fetal anaemia or severe/prolonged fetal hypoxia with acidosis and are associated with poor fetal outcomes.

The analysis of the Dawes Redman system should be acted on immediately and discussed with the Delivery Suite Band 7 or Senior Registrar and above.

Back to Contents

7.9 Suspected sinusoidal rhythm

Sinusoidal FHR needs to be distinguished from a pseudo sinusoidal FHR which, while it closely resembles a sinusoidal pattern, is usually transient, resolves spontaneously and is associated with a good fetal outcome.

Where a diagnosis of Sinusoidal FHR pattern is made, immediate intervention is required with probable emergency delivery if intrauterine resuscitation is not appropriate.

The CTG should be continued.

Maternal blood should be taken for an urgent Kleihauer test to assess the degree of any fetomaternal haemorrhage.

The Delivery Suite Band 7,Obstetric Registrar, Obstetric Consultant, Neonatologist and Haematologist, should be alerted.

Back to Contents

7.10 Long-term variation in high episodes below acceptable level

This should be acted upon in the same way as STV.

Back to Contents

7.11 No accelerations

In this event the CTG trace should be continued but should be reviewed by Delivery Suite Band 7 or Senior Registrar and above.

(Dawes Redman analyses acceleration using a slightly lower threshold (>10bpm) than FIGO and NICE definitions).

DO NOT RELY ON THE ANALYSIS IN ISOLATION

It may not always identify abnormal patterns that may be more obvious from visual interpretation with a holistic expert assessment of the whole clinical scenario.

Back to Contents

8 References

Cochrane review, (2015) Antenatal cardiotocography for fetal assessment. Wiley Online.

Morris RK, Johnstone E, Lees C, Morton V, Smith G; the Royal College of Obstetricians and Gynaecologists. Investigation and Care of a Small-for-Gestational-Age Fetus and a Growth Restricted Fetus (Green-top Guideline No. 31). BJOG. 2024;131(9):e31–e80. https://doi.org/10.1111/1471-0528.17814

Back to Contents