

Advanced Intermittent Auscultation (AIA) of fetal heart rate in labour - A comprehensive regime & training module for international midwifery / obstetric practice

Shashikant L Sholapurkar*

Department of Obstetrics & Gynaecology, Royal United Hospital, Bath, England, United Kingdom

DOI: <https://doi.org/10.66856/ijgor.2026.8.3.8008>

Abstract

Judicious intrapartum fetal heart rate (FHR) monitoring is important to prevent birth asphyxia. In many developed countries 'intermittent auscultation of FHR (IA)' is an accepted method in low-risk labours. Furthermore, cardiotocography (CTG) is not available widely in resource-poor countries where IA is the only choice. It has been traditional to actually count the fetal heart tones during IA and most international guidelines still insist on that. However, hand-held Doppler FHR monitors are now affordable and widely available all over the world. Because the Doppler monitors display an accurate concurrent FHR, there seems no need to actually count anymore. A recent survey of British midwives revealed that 65% found counting FHR every 5 minutes in second stage very laborious and 76% said they sometimes simply couldn't adhere to this frequency. 'Advanced Intermittent Auscultation' does not require manual counting and relies on visual (and audible) interpretation of displayed FHR on the Doppler device after uterine contractions. AIA has been proposed to be more scientific, less laborious, more versatile and safer than the other regimes of IA. This article makes 'AIA regime and training module' accessible in a published form for use by birth attendants in different parts of the world.

Keywords: Advanced Intermittent Auscultation, intermittent auscultation, intrapartum fetal monitoring, fetal asphyxia, fetal heart rate decelerations, intrapartum fetal surveillance, late decelerations, baseline variability

Introduction

Fetal hypoxia in labour can have devastating consequences for the baby and the family. Intermittent Auscultation (IA) of fetal heart rate (FHR) is recommended in low-risk labours by many international guidelines^[1, 6] because of its perceived safety, low-tech nature and lower operative delivery rates associated with it. Unfortunately, cases of serious intrapartum asphyxia continue to occur, suggesting that there is a scope for an improved regime and consistency or some standardisation. Most current international guidelines continue to recommend actual counting of fetal heart rate tones using a stethoscope for a minute or so after uterine contractions, based on the practice before 1990s^[7]. However, since then the hand-held Doppler FHR monitors have become widely available all over the world. 'Advanced Intermittent Auscultation (AIA) regime and training module' was proposed in 2022 as a more scientific, accurate, safer, versatile and user-friendly method of IA^[8]. The National Institute for Health and Clinical Excellence (NICE) recommends FHR to be manually counted for 1 minute starting at the end of a contraction and write it down as a single number (presumably the baseline)^[1,2]. It has been shown that the single-count IA crucially does not accurately represent the FHR baseline or late decelerations when present, thus posing risk to the babies and birth attendants^[9]. A complicated multiple-count IA has also been proposed where FHR is manually counted multiple times over intervals of 15 seconds each^[5, 10, 11].

The author conducted an anonymous survey of British midwives in October – November 2025. It revealed that

64% of the midwives found it difficult and laborious to perform the single-count IA^[1-4,6] particularly every 5 minutes in the second stage of labour with 76% midwives simply unable to achieve that frequency at times. Many midwives (80%) reported that actual counting heart tones for one minute every 5 minutes left them little time to do other important aspects of care and even have enough time to analyse the inferences from the auscultation. Fifty-six percent midwives had heard or were aware about the multiple-count IA but only 18% had ever tried it. No maternity units in the UK have adopted the multiple-count IA regime so far. Vast majority of midwives (92%) expressed preference to simply observing the FHR number displayed (and listening to tempo but not counting) for a minute or longer, if that becomes an accepted regime. Most (82%) midwives reported that it would be very much in their skill-set to interpret FHR changes by simply observing the Doppler device display.

In the UK, currently computerised training modules of AIA with electronic audiovisual examples of various FHR patterns on Doppler device display are being designed. These are expected enhance training and testing of birth attendants. Clinical studies comparing different regimes of IA are also in the planning stage.

The regime and training module of AIA is described next as proposed initially in 2022^[8]. This should facilitate a safer and scientific practice of IA more widely as well as more clinical studies can be designed in different parts of the world. The readers should also access the on-line version of the AIA regime for better visual layout and readability.



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of Fetal Heart Rate in Labour

A Comprehensive Regime & Training Module for the British and International Midwifery / Obstetric Practice

Author Affiliations



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May 2, 2022 DOI: 10.13140/RG.2.2.31563.87841

Author Affiliations



Authors

Mr Shashikant L Sholapurkar, MD, DNB, MRCOG
Consultant Obstetrician and Gynaecologist,
Royal United Hospital NHS Foundation Trust,
Bath, UK

Dr Tanya Capper, DipHE Midwifery, GradDip Midwifery,
MMid, LL.B, PhD
Head of Course - Bachelor of Midwifery (Graduate Entry),
CQUniversity, Brisbane, Australia

There are things known and there are things unknown, and in between are the Doors of Perception. The person who comes back through the Door will never be quite the same as the person who went out. That person will be wiser but less certain (less dogmatic), happier (knowledgeable) but less self-satisfied, humbler in acknowledging one's ignorance yet better equipped to understand the relationship of words to things, of systematic reasoning to the unfathomable mystery which it tries, forever to comprehend.

Adopted from Aldous Huxley, 1954



Mr Shashikant L Sholapurkar, MBBS (1982), MD (1986), DNB, MRCOG (1993).
Consultant Obstetrician and Gynaecologist,
Royal United Hospital NHS Foundation Trust, Bath, United Kingdom.

Mr Sholapurkar has had extensive 'hands-on experience' of IA for 8 years in low and greater proportion high-risk cases in a regional medical centre in India between 1984 and 1992 (when hand-held Doppler monitors and CTG were not available). This was followed by experience in CTG of over 30 years and supervisory role in IA using Doppler devices and Pinard in the United Kingdom. He has many influential publications on IA and CTG which are very widely read. He has given invited lectures on IA and CTG internationally.



Dr. Tanya Capper, DipHE Midwifery, GradDip Midwifery, MMid, LL.B, PhD
Head of Course - Bachelor of Midwifery (Graduate Entry),
CQUniversity, Brisbane, Australia.

Tanya has over 24 years of international clinical midwifery experience. She has held several senior clinical roles in birthing services in both the UK and Australia. She has many academic and clinical practice papers published in medical journals. Tanya is currently the Head of Course (Bachelor of Midwifery – Graduate Entry) at CQUniversity, Australia.

Advanced Intermittent Auscultation (surveillance)

AIA of Fetal Heart Rate (FHR) in Labour: Training Module

Premise this training module is designed for midwives, obstetricians and their professional bodies who are obliged a highly safe, pragmatic and practical regime for IA of FHR for their clients. The current multitude of regimes of IA are felt to be deficient in some important aspects, often restricted by the lack of clear conclusions from many systematic reviews. The Advanced Intermittent Auscultation or surveillance (AIA) is forward looking and adopts a broad evidence-based approach - assimilating clinical studies, published literature and critical analysis of birth-attendants' knowledge and experience. Birth-attendants would be keen to implement its principles in their practice right away. AIA should be adopted and recognised by maternity guideline-makers worldwide.

This module introduces the basics of AIA and elaborates how to detect and interpret relevant FHR patterns in relation to contraction cycle during labour to prevent fetal hypoxia and its serious consequences. The midwives should gain practical knowledge about the indications, methodology, regime and implementation of AIA.

The Concept of the Fetal Heart Rate and Implications for Intermittent Auscultation. The 'number of heart beats per minute' is simply a convenient concept to infer how fast or slow (frequency) the pumping action (beating) of the heart is - which is what we want to know. That concept does not actually exist over a minute but happens to be an accident of how we measure time. The speed (frequency) of heart-beating (conceptualised as beats/min) is changing throughout the minute of auscultation, especially in a fetus during labour (unlike in resting adults in whom it is 'relatively' stable).

The Doppler device advantageously calculates the current FHR at any given moment by measuring the time interval between successive ventricular contractions (similar to the ECG calculating HR by measuring RR-intervals). The varying heart-beating is instantaneously displayed on a Doppler device. Thus, where a Doppler-device with digital display is available and widely used, there seems no need to actually count the heart beats or tones.

In this Advanced AIA module, the time-honoured terminology "Intermittent Auscultation" will be used synonymously with "Intermittent surveillance" of FHR, short of continuous electronic monitoring, with a primary emphasis on observing and listening but not necessarily counting.



Cardiotocography (CTG) vs Intermittent Auscultation (IA). Pros & Cons

Cardiotocography (CTG) comprises of a continuous recorded tracing of FHR using a Doppler signal together with a contraction trace (mostly by external pressure transducer). The CTG provides a more detailed information but there are several variations in the interpretation guidelines and performance by the birth-attendants. Hence, CTG has not been shown to be superior to IA in improving perinatal outcome ^[12]. On the other hand, CTG significantly increases the incidence of operative birth ^[12]. Moreover, paradoxically, there has been increase in medicolegal litigation with the use of CTG.

Intermittent auscultation (IA) evaluates the FHR patterns with a much simpler equipment like a Pinard or standard clinical stethoscope or a hand-held compact Doppler device. This makes IA applicable to diverse healthcare settings including home births, rural / remote areas and low-income countries. IA offers labouring women a low-tech choice. The simplicity of IA seems its most important asset, traditionally requiring it to focus on the FHR baseline and late decelerations ^[1-4].

The “Advanced IA” constitutes a major step forward by enabling midwives to more reliably detect the FHR baseline, periodic changes like decelerations; as well as suspect or detect reduced baseline variability overcoming the main objection to IA from many obstetricians.

The Role for Advanced Intermittent Auscultation (AIA)

- Fetal hypoxia in labour can have serious consequences of perinatal morbidity / mortality and cerebral palsy and possibly cognitive impairment.
- Based on consensus, background knowledge and experience, intrapartum CTG is recommended in the presence of maternal or fetal risk factors ^[1-4].
- NICE ^[1-2] in the UK preferentially recommends IA in the absence of risk factors (in up to 45% of all labours) because IA is associated with lower operative delivery rate while maintaining safety. centres, woman’s home, or where the woman is immersed in water, IA is often the only method of FHR assessment available.
- Labour being a natural life event, IA offers women a low-tech choice.
- IA enables labouring women to remain upright, active, and adopt optimal positioning to help facilitate the normal physiological processes of labour and birth ^[16].
- However, currently there is very variable guidance on how exactly IA should be performed. ⁵ This seems a result of exclusive emphasis on empirical studies which have been difficult / inconclusive. However, the AIA presents a strong reason-informed method for the technique and regime of intermittent FHR surveillance or auscultation, based on clinical studies and the aggregated knowledge (not dissimilar to CTG).

- Scientific and reliable IA technique is vital if it is to be practical, effective and safe. The AIA best fulfils most of these requirements

Indications for Advanced Intermittent Auscultation (AIA)

- Risk identification/assessment must have taken place at onset of labour or on admission

AIA is appropriate in Low risk, uncomplicated pregnancy and labour

- Where staff are appropriately trained to undertake IA
- Staffing – one to one midwifery care in resource-rich countries
- There should be continued assessment of risk factors during labour, which is a standard practice.
- Maternal request and informed choice
- In environments where no alternative methods are available
- During transfer or unavoidable interruption of CTG

What is currently taught or practised?

In the United Kingdom, NICE guidelines ^[1-2] mandate actual counting of FH sounds for one minute after a contraction and to be documented as a single figure. Frequency: every 15 mins in first stage and every 5 mins in second stage. The “intelligent IA” and K2MS™ training programme also insist on actual counting ^[1].

The K2MS training module makes a profoundly wrong assertion that the Doppler device is less accurate “indirect way” of assessing FHR compared to direct counting ^[19]. In Austria, RANZCOG ^[4] simply states: IA must be performed with a technique that can accurately measure the fetal heart rate in the individual woman. In practice, there does not appear to be any consistent method taught/followed. Each auscultation episode should commence toward the end of a contraction and be continued for at least 30–60 seconds. Frequency:

Every 15–30 minutes in the active phase of the first stage and with each contraction or every five minutes in the active second stage of labour. (Consensus recommendation) The practicality, feasibility, robustness and burden of these regimes have been debated ^[20, 21].

Most IA guidelines state the Doppler device and Pinard stethoscope as equally reliable or practical, which seems to disregard the practical knowledge and experience, and preference there of.



Equipment for Advanced Intermittent Auscultation (AIA)

1. **Pinard (Fetal) Stethoscope:** The traditional midwifery instrument which is a trumpet shaped tube. The robust Metal ones are comparable in cost to basic clinical stethoscopes. It is simply the very early version of the clinical stethoscope and does not seem to have any benefits over it. However, it is adequate for listening and counting the fetal heart sounds, if preferred.
2. **Modern dual Head stethoscope:** It is generally more widely available than Pinard. Its “Bell” end should be pressed on the abdomen by holding the peripheral metal ring of the opposite diaphragm end. It delivers clearer and louder Fetal heart sounds than the Pinard.² Fetal heart sounds are distinct tones and should be differentiated from an umbilical souffle (a longer sound). Generally, only the first heart sound (S1) is heard and it is not necessary (and very difficult) to separate first and second heart sounds of the fetus. The birth-attendants should try different stethoscopes and then decide.
3. **Hand-held Doppler Units:** These are now ubiquitous in resource rich countries and most hospitals in medium income countries. A forward motion of the heart during the cardiac cycle creates a “Doppler-shift” which is converted into a sound tone by the device. The time interval between successive Doppler-shifts is continuously computed by the device to display a contemporaneous fetal heart rate (the current cardiac pumping frequency) as a digital figure of FHR / min. This is a major advance over actually counting the fetal heart tones over any length of time period. The newer Trace-display hand-held Doppler monitors are unsatisfactory alternative to CTG and have not proven popular in developed countries. These may have a role in settings where the option of switching over to cardiotocography is not available.

The Best and Recommended Equipment for IA: The hand-held Doppler device (DD)

- Clinical studies comparing Pinard stethoscope vs Doppler device provide no guide because they are inconclusive, unreliable and lack the power to detect differences in perinatal outcomes^[13, 16]. The DD has several practical advantages over a Pinard and would be an equipment of choice based on crucial Bayesian standpoint^[13]. The AIA strongly recommends using DD when available, which has already become a default practice in resource-rich countries for very good reasons^[17-19].

Advantages of the Doppler Device

The FHR read-out on Doppler Device has exactly the same highest accuracy as the FHR recorded on CTG – a gold standard (uses the same Doppler-shift technology)^[22].

- User- friendly, labour-saving, far more accurate and informative than counting - gives instantaneous FHR, informs temporal variation in FHR more perceptibly (one can hear better well), True baseline can be more reliably ascertained^[13].
- Auscultation duration can be flexibly extended as much as required. Auscultation can also be easily repeated (non-tiring). This will spare attention-bandwidth of midwives to facilitate the information-processing of FHR variations, decision-making and other aspects of intrapartum care (but only if FHR display is observed and tones are not actually counted).
- Furnish imminent potential to judge baseline variability.
- Often reassuring and anxiety-reducing to mothers to hear the fetal heart sounds when normal.

Disadvantages of the Doppler Device

- Cost (however, widely affordable and available now)
- Requires batteries (a disadvantage in the 19th century only)

Rare difficulty of doubling of FHR

Nurse-midwives in developed countries have plenty and on-going experience in picking up FH tones with Doppler while using CTG. The same skills and precautions (as during the CTG) are required while detecting FHR with a hand-held doppler device.

In the presence of marked fetal bradycardia, very rarely the Doppler device may display intermittent doubling of FHR. However, the display often jumps between the two figures e.g, 70 and 140/min. Moreover, the audible tones of FHR correspond to the correct lower heart rate and would alert the midwife. This phenomenon is also experienced during CTG, familiar to most birth-attendants in developed countries.

The K2MS training module makes a profoundly wrong assertion that the Doppler device is a less accurate “indirect way” of assessing FHR^[11]. In contrast, a clinical trial concluded, “The accuracy of the Doppler monitor was excellent compared with CTG, with mean difference of -0.3 bpm only and 95th centile difference between -1.6 (CI -2.0 to 1.3) and +1.0 (CI 0.7–1.4) bpm, with intraclass coefficient 0.99^[22].”

Documentation of the Advanced Intermittent Auscultation (AIA)

An accurate record of maternal signs and AIA during labour is essential. The IA record Should be Contemporaneous, Clear and Legible, Signed and Timed and Dated.

Maternal pulse should be counted and recorded each time AIA is performed. This would differentiate FHR from maternal HR, and if in doubt, both can be assessed simultaneously. All episodes of IA should be documented in the patient notes and the partogram on paper or in the digital/electronic record.

Advanced Intermittent Auscultation (surveillance) of FHR

What to detect during AIA

- Assess the FHR baseline rate

- Detect FHR Late Decelerations
- Simply note any Accelerations
- Imminent Potential to Assess FHR Baseline Variability

The Advanced IA combines the benefits from advances in Doppler technology and knowledge about FHR changes from the experience in CTG. It removes excessive and unnecessary cognitive burden on birth-attendants improving reliability of IA and thus patient safety. It facilitates holistic and comprehensive patient centred midwifery care. Unproven and unnecessary parameters like post-deceleration overshoots, cycling and rise of baseline within normal range are best avoided to retain the advantages of IA, based on the Law of Parsimony.



Method of Advanced Intermittent Auscultation or surveillance (AIA)

Birth-attendants should simply start watching the FHR digital display on the Doppler-device towards the end of contraction and continue till the beginning of next contraction. Watch the FHR figure go up or down (Accelerations/decelerations if the variation is roughly around 15 bpm or more). Simultaneously listening to the tempo of heart beats (not counting) also aids in assessing the periodic variations. The alternative method of actually counting by 'single or multiple count method' is very arduous, inaccurate and hence not the safest or practical.

The frequency of auscultation should be every 15-30 minutes in the first stage and every 5-10 minutes in the second stage.

All international guidelines on IA currently fail to recommend doppler device over counting out of misconceptions.

The British Guideline-makers (NICE, RCOG, RCM) should approve AIA selecting an auscultation frequency of every 15 minutes in the first stage and every 5 minutes in the second stage of labour, if that remains the consensus in UK.

It would be better and more convenient to monitor FHR after 2 or 3 contractions taking 5-10 minutes and then give a gap of 15 - 20 minutes.

There seems no rationale to auscultate FHR strictly every 15 minutes, particularly in low-risk labours ^[13, 20].

IA is not intended to detect the extremely rare 'out of the blue prolonged fetal bradycardia' in low-risk cases, without a sentinel event, which even IA every 15 minutes can miss. Such bradycardia almost always recovers spontaneously.

Baseline Fetal Heart Rate

Watch for the FHR figure on the Doppler display which may go up or/and down (Accelerations or decelerations if the variation is around 15 bpm or more). Determine which the steady FHR figure is excluding the larger variations if present. A reliable baseline is often seen for a period before the onset of next contraction. The baseline FHR could be written as a single figure. A narrow range (more realistic) is not necessarily a wrong documentation and may even become preferable when the birth attendants gain confidence with judging the short-term baseline variability.

The normal baseline FHR for AIA is 120 -160 / Minute

Late Decelerations

- All regimes of IA have aimed to detect Late Decelerations (hence auscultate/ observe FHR after a contraction).
- Methods that advocate actual counting of heart sounds (a single count over a minute or in multiple segments of 15 seconds) are quite inaccurate in judging the onset,

duration and depth of decelerations as well as other periodic changes. One cannot predict in advance which parts of the total counting would contain the periodic changes.

- Watching the digital display gives estimation about when, how long and how much the FHR is dropping in relation to the baseline. None of these can be reliably estimated by counting the heart beats.
- If uncertain or in doubt, continue auscultation (observation of display) during/ after the next contraction in light of the information obtained during the previous contraction. Since, one is not having to count for one minute to about 120 -160, it is far more conducive to auscultate longer and over more contractions. The ‘multiple-count method’ is even more laborious involving separate counting over epochs of 15 seconds for a minute and doing exhausting and fallible mental arithmetic. This method is described in detail elsewhere ^[13].
- It is important to ignore any FHR decelerations that are concordant with the contraction i.e, those which have recovered by the end of the contraction ^[1-4, 13]. The contraction induced fetal hypoxaemia of any cause tends to cause late decelerations ^[1-4, 13, 23].
- Auscultation over a full cycle is a sound method provided the birth-attendants do not get worried about decelerations during contractions and unnecessarily switch over to cardiotocography. As a compromise, auscultation starting towards the end of a contraction would suffice.

Accelerations

- An acceleration can be inferred when a rise of FHR of 15 bpm or more is observed on Doppler-device display, preceded by a normal FHR baseline and return to it after the acceleration.
- Presence of accelerations is a reassuring sign of a well-oxygenated active fetus and generally indicative of a normal baseline variability as well. However, the absence of accelerations on its own (even on CTG) has not been correlated to fetal hypoxaemia or acidaemia ^[1-4, 13]. It is not uncommon for fetal movements to decrease during labour because of intermittent reduction in oxygen supply during labour, and the fetus may conserve its energy, thus oxygen consumption. Hence, the absence of accelerations by itself is not an indication to switch over to CTG.
- During AIA, midwives should note and document any accelerations encountered. It is important to note accelerations as a reassuring feature and also to reliably interpret the correct FHR baseline and decelerations. During AIA, it is not mandatory to actively seek accelerations in the low-risk cases.

Baseline Variability

(Imminent Potential Application not currently mandatory)

- Traditionally, the IA is not meant to pick up abnormal or low baseline variability. Although some IA regimes ^[17] claim to detect ‘baseline variability’ in their goals, it is not seen to be materialised. No amount of actual counting of heart-tones, even in short, repeated time-epochs, can give dependable or truthful measure of baseline variability.
- However, for the first time, with the advent of digital display of instantaneous FHR on Doppler-device, it would be possible to make a fair judgement about short-term

baseline variability. The birth-attendants can see the FHR number going up or down on the screen-display and could surmise if it has varied by 5 beats or more during the auscultation period (excluding decelerations). It does not have to be FHR variation between successive beats (beat-to beat variability) which is not judged even on a CTG trace. Acceleration when inferred is indicative of good variability. Not having to actually count or perform complicated mental arithmetic is important if birth-attendants have to develop and practice this skill. Such ability could be bolstered / learnt by observing FHR display and hearing heart tones during the CTG in the presence of evident on-going reduced or normal variability

- In low-risk pregnancies and labour, it would be extremely rare for the fetus to have low baseline variability especially if the mother has been feeling good fetal movements before labour. One of the major advantages of this ‘Advanced IA’ is its inherent imminent potential to detect or suspect low baseline variability prompting switch over to CTG. Some units perform an “Admission CTG” as a local preference, which would become unnecessary when variability will be judged during ‘Advanced IA’.

Baseline variability could be judged every 30 minutes. If abnormally low variability (<5bpm) suspected, then auscultation should be repeated over 2-3 contractions and again after 15 minutes. Being a new skill, it could be documented as normal / abnormally low / not assessed; until further evidence becomes available and the birth-attendants become familiar / trained in the technique.

Intermittent Auscultation when a ‘Doppler-device with FHR display’ is not available

Fortunately, the Doppler monitors have become cheaper and widely available even in resource poor settings.

In the absence of a Doppler monitor, the Pinard stethoscope or the bell end of a common clinical stethoscope should be placed on mother’s abdomen to listen and count the fetal heart sounds.

A ‘multiple-count strategy’ with counting and estimating FHR every 15 seconds during the auscultation period is ideal ^[10]. This is possible with self-learning and experience but remains arduous. It was the author’s standard practice for many years in 1980s. It is still much less accurate compared to observing the Doppler digital readouts.

The Oxford experience showed that 50% of birth-attendants found the ‘multiple count method’ very difficult ^[18]. It has hardly been practised in the UK or Australia in the past or currently.

When the experience of ‘multiple-count method’ is lacking, a single count method could be practiced only where Doppler device is not available. One is restricted to counting rigidly for a minute in this situation. It gives a rough estimation of the FHR baseline and any decelerations could be subjectively “heard” and assessed.

Thus, the actual counting of FH sounds seems necessary only in rural / remote areas in resource poor countries. However, the role of fetal monitoring becomes limited because of constraints on timely transfer, access to modern maternity units, lack of safe operative delivery and low specificity of intrapartum fetal monitoring itself ^[13].

Escalation to continuous electronic fetal monitoring or CTG

- When IAI reveals abnormal baseline, persistent late decelerations or suspicion of abnormally low baseline variability, then
 - Perform prolonged and/or more frequent observation of FHR by IA.
 - Look for correctable cause like maternal position, hydration, strength/frequency of contractions
 - Ask for help or senior input.
 - Recommend and commence CTG.
 - Follow guidelines for CTG interpretation.
 - Transfer to Obstetric consultant unit may be required.
 - If CTG shows no abnormality and confirms normal pattern for 30 minutes, then it would be an option to switch back to AIA.
- In addition, if any risk factors for fetal hypoxia develop during labour, then CTG should be commenced. NICE ^[1, 2] recommends CTG

If two or more of following,

- prolonged rupture of membranes (24 hours or more)

- moderate hypertension (150/100 to 159/109 mmHg)
- confirmed delay in the first or second stage of labour
- the presence of non-significant meconium.
- suspected chorioamnionitis or sepsis, or a temperature of 38°C or above

If any of the following

- oxytocin use
- the presence of significant meconium (see recommendation 164)
- fresh vaginal bleeding (not show) that develops in labour

(The lists No 1 and 2 above are not all-encompassing and the birth-attendants should use further discretion)

Examples of Advanced Intermittent Auscultation (AIA)

Following are the digital read-outs after a contraction which can be flexibly extended beyond 1 minute unto the onset of next contraction.

Question: What is the FHR baseline, any periodic changes and baseline variability in the following four examples?

Example No 1

			Previous Contraction ends					60 Digital Read-outs on a hand-held Doppler device over 1 minute														
138	140	140	142	141	140	142	145	146	144	140	147	148	140	140	138	140	140	142	143	143	140	
144	144	140	143	140	143	144	138	138	140	139	140	140	144	146	148	148	143	140	140	142	140	
145	140	140	147	143	138	140	140	140	146	140	138	140	140	144	144	140	140	138	140	140	140	

Example No 2

Previous Contraction ends						60 Digital Read-outs on a hand-held Doppler device over 1 minute															
126	124	120	121	120	122	122	120	124	123	122	124	125	128	127	126	124	128	133	135	135	136
138	140	140	142	141	143	142	145	146	147	147	148	149	145	150	146	150	146	142	145	146	148
148	147	144	146	152	147	147	150	148	144	140	147	144	140	140	138	142	149	146	146	148	148

Example No 3																							
Previous Contraction ends								60 Digital Read-outs on a hand-held Doppler device over 1 minute															
138	140	140	142	141	143	142	145	146	147	147	148	149	145	150	152	150	146	150	154	155	157		
158	160	164	161	158	155	154	155	156	156	157	153	151	150	148	146	147	146	142	145	146	142		
146	147	144	144	142	147	147	145	146	144	140	147	144	140	140	138	142	144	142	144	144	140		

Example No 4																							
Previous Contraction ends								60 Digital Read-outs on a hand-held Doppler device over 1 minute															
142	140	140	141	141	140	140	140	143	143	142	140	140	140	143	143	140	142	142	142	142	140		
14	14	14	14	14	14		14	14	14	14	14	14	14	14	14	14	14	14	14	14	14		
0	1	1	2	2	0		0	0	2	3	2	3	1	0	3	4	0	2	1	0	0	0	
143	141	140	140	143	143	143	140	141	141	141	143	142	142	140	143	140	142	141	140	140	140		

Answers

Example No 1: FHR baseline about 140 / min, good baseline variability (> 5bpm), No Accelerations or Decelerations.

Example No 2: FHR baseline about 148 / min, good baseline variability (> 5bpm), There is a Late Deceleration down to 120/min at the end of previous contraction, slowly recovering to baseline of about 146 / in the middle part of the auscultation. No Accelerations.

Example No 3: FHR baseline about 144 / min, good baseline variability (> 5bpm), There is an Acceleration to 160/min in the middle part of the auscultation. No Decelerations.

Example No 4: FHR baseline about 142/ min, Poor baseline variability (< 5bpm), No Accelerations or Decelerations.

Declaration: The content of this training module is based on the long and broad experience of the authors and their previous publications. Uncertainties remain in the science of intrapartum fetal monitoring. This training module is advisory and instructional only. The authors are not liable for any clinical or other outcomes. Some of the contents reflect consensus opinion only.

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