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FIGO CONSENSUS GUIDELINES ON INTRAPARTUM FETAL MONITORING

Safe Motherhood and Newborn Health Committee
Co-ordinator: Diogo Ayres-de-Campos

INTERMITTENT AUSCULTATION

Debrah Lewis, Soo Downe, for the FIGO intrapartum fetal monitoring consensus panel.

Consensus panel: Daniel Surbek (Switzerland*), Gabriela Caracostea (Romania*), Yves Jacquemyn (Belgium*), Susana Santo (Portugal*), Lennart Nordström (Sweden*), Vladas Gintautas (Lithuania*), Tulia Todros (Italy*), Branka Yli (Norway*), George Farmakidis (Greece*), Sandor Valent (Hungary*), Bruno Carbonne (France*), Kati Ojala (Finland*), José Luis Bartha (Spain*), Joscha Reinhard (Germany*), Anneke Kwee (Netherlands*), Romano *Byaruhanga* (Uganda*), Ehigha Enabudoso (Nigeria*), John Anthony (South Africa*), Fadi Mirza (Lebanon*), Tak Yeung Leung (Hong Kong*), Ramon Reyles (Philippines*), Park In Yang (South Korea*), Henry Murray (Australia and New Zealand*), Yuen Tannirandorn (Thailand*), Krishna Kumar (Malaysia*), Taghreed Alhaidary (Iraq*), Tomoaki Ikeda (Japan*), Ferdusi Begum (Bangladesh*), Mamoona Mushtaq (Pakistan*), Jorge Carvajal (Chile*), José Teppa (Venezuela*), Renato Sá (Brasil*), Lawrence Devoe (USA**), Gerard Visser (Netherlands**), Richard Paul (USA**), Barry Schifrin (USA**), Julian Parer (USA**), Philip Steer (UK**), Vincenzo Berghella (USA**), Isis Amer-Wahlin (Sweden**), Susanna Timonen (Finland**), Austin Ugwumadu (UK**), João Bernardes (Portugal**), Justo Alonso (Uruguay**), Sabaratnam Arulkumaran (UK**).

* nominated by FIGO associated national society; ** invited by FIGO based on literature search

The views expressed in this document reflect the opinion of the individuals and not necessarily of the institutions that they represent.

INTRODUCTION

Intermittent auscultation (IA) is defined as the technique of listening to the fetal heart rate (FHR) at intervals rather than continuously. Whether it be used for intrapartum fetal monitoring in low risk women or for all cases in settings where there are no available alternatives, all healthcare professionals attending labor and delivery need to be skilled at performing IA, interpreting its findings, and taking appropriate action. The main aim of this chapter is to describe the tools and techniques for IA in labor.

HISTORICAL BACKGROUND

Hippocrates is said to have described the technique of listening to the internal activity of the body by placing the ear on the skin proximal to the organ under examination. However, the perception of fetal heart sounds using this method was not reported until the 1600's [1]. Little notice appears to have been taken of this until 1818, when fetal heart auscultation was discussed by both Mayor and Kergaradec [2], with the purpose of determining whether the fetus was alive or dead. Interest then accelerated, and, in 1833, Kennedy published a book on the subject of obstetric auscultation [3].

The first recorded use of an amplification device for auscultation of the adult heart rate is attributed to Laënnac in 1816, who overcame the embarrassment of placing the ear on a young woman's chest to hear her heart beat, by rolling sheets of paper into a tube and listening through this device. This tool was soon replicated in wood, and the technology was rapidly applied to fetal heart auscultation. The most common instrument currently used for this purpose is the Pinard stethoscope (Fig. 1 & 2). In some countries, notably the US, the DeLee stethoscope is used as an alternative (Fig. 3). In both cases, the

technology has not changed radically from the original design, in which a belled tube creates an amplification chamber for sound waves that are directly transmitted from the fetal heart to the examiner's ear.

More recently, instruments that rely on the Doppler effect, the Doptone (Fig. 4), have been used for IA, as well as for continuous CTG. However, as described in Chapter 3, these apparatuses do not transmit the actual sound produced by the fetal heart, but rather a simulation of this, based on ultrasound-detected movements of intracardiac structures, that are then subject to signal modification and autocorrelation.

	Advantages	Disadvantages
Pinard stethoscope	Inexpensive Readily available in most countries No consumables needed	May be difficult to use in certain maternal positions
DeLee stethoscope	Inexpensive Readily available in some countries No consumables needed	May be difficult to use in certain maternal positions
Doptone	May be more comfortable for the woman FHR audible to all present in the room Can be used in various maternal positions and locations (e.g. in water) May calculate and display FHR values	More costly to purchase and maintain Requires batteries Probe is very sensitive to mechanical damage

Table 1. Advantages and disadvantages of instruments used for intermittent auscultation

OBJECTIVES AND INDICATIONS

As for other approaches to fetal monitoring, the main aim of IA is the timely identification of fetuses that are being inadequately oxygenated, to enable appropriate action before the occurrence of injury. It also allows the confirmation of adequate fetal oxygenation, so that unnecessary obstetric intervention can be avoided. Systematic reviews of randomised controlled trials carried out in the 1970s, 1980s and early 1990s, comparing IA with continuous cardiotocography (CTG) for intrapartum monitoring in both low- and high-risk women, showed that CTG is associated with a lower risk of neonatal seizures, but no difference in the incidence of overall perinatal mortality or cerebral palsy[4]. Cesarean section and instrumental vaginal delivery rates were also higher in the CTG arm. The overall interpretation is that there is no conclusive evidence for the benefits of either continuous CTG or IA monitoring. (see Chapter 3).

IA is frequently used for routine intrapartum monitoring in low-risk cases. It is also the option of choice in settings where there is either no access to CTG monitors or to the tools and resources necessary for using them.

ADVANTAGES OF IA

Performing regular IA ensures frequent contact between healthcare professionals and the laboring woman, offering the opportunity for social and clinical support. This optimizes the therapeutic benefits of interpersonal relationships[5] and allows for assessment of other physical parameters, such as maternal skin tone and temperature, and breathing rates and patterns, and for direct palpation of fetal movements and of the strength of maternal contractions.

IA also permits the fetal heart to be monitored in various positions and locations and favors the mobility of laboring women, which has been shown to benefit the progress of labor[6]. Another benefit of IA is the easier sustainability and availability of the technology, which allows it to be undertaken in even the lowest resource settings.

DISADVANTAGES OF IA

It takes time to develop clinical expertise with IA when performed with a fetal stethoscope. Initially it may not be easy to recognize the fetal heart sounds, and later on there is a slow learning curve for the identification of accelerations and the different types of decelerations. Even for the most experienced healthcare professionals, it is difficult to recognize subtle features of the FHR, such as variability. Sometimes awkward positions need to be adopted for effective auscultation, therefore healthcare professionals should ensure good ergonomic position for themselves and the laboring woman when using IA. There is usually no confirmation of the findings by other healthcare professionals, or by those in the room, and this may lead to uncertainty in medical-legal cases.

Many of these disadvantages are overcome by the use of a handheld Doptone. When the latter includes a display showing the instantaneous FHR, even low variability may be identified if auscultation is prolonged for several minutes.

Whichever method of IA is used, the need for regular personal attendance on laboring women can cause difficulty in busy labor units where there are few appropriately trained staff.

TECHNIQUE FOR PERFORMING IA

Before IA is initiated, a clear explanation of the technique and its purpose should be provided to the laboring woman, and her consent obtained. This is followed by an assessment of the fetal position on abdominal palpation, and placement of the stethoscope/Doppler probe over the fetal back, as this is where the heart rate will be heard most clearly. At the same time as IA is performed, a hand is placed in the uterine fundus to determine the frequency and duration of uterine contractions.

There are no studies comparing the effectiveness and safety of different auscultation intervals[7]. Therefore, recommendations for the scheduling of IA are based on expert opinion. While the existing evidence does not preclude other timings of IA, standardisation of procedures is important for planning of healthcare during labor and for medical-legal purposes.

The most common practice recommendations for performing IA are considered in Table 2.

Features to evaluate		**What to register**
FHR	Duration: at least 60 seconds.	Baseline (in bpm), presence or absence of accelerations and decelerations. If decelerations are present continue to monitor for at least 3 contractions and register their type: early, variable, late, prolonged and repetitive (see Chapter 3 for more details).
	Timing: before, during and at least 30-60 seconds after a contraction.	
	Interval: Every 15 minutes in the Active Phase of the 1st stage of labor. Every 5 minutes in the 2nd stage of labor.	
Uterine contractions	At the same time as FHR auscultation	Frequency and duration of uterine contractions.
Maternal heart rate	Every 60 minutes.	Register in bpm.

Table 2. Current most common practice recommendations for IA, uterine contraction and maternal heart rate monitoring during labor.

All the features listed in Table 2 need to be recorded in dedicated labor charts, to provide an ongoing account of the fetal heart rate, and as a basis for sharing information between caregivers who may become involved in the process.

TAKING APPROPRIATE ACTION

If assessment of the parameters described in Table 2, and the general behavior of the mother, indicate the continuous wellbeing of both mother and baby, IA may continue to be the technique of choice for labor.

Abnormal findings on IA are listed in Table 3. Sometimes, variable decelerations can occur due to the maternal supine position and resulting aorto-caval compression. Changing the maternal position may quickly revert the situation. However, if a rapid normalization does not ensue, or if other types of decelerations or baseline changes are detected, continuous CTG should be immediately started where available and with maternal consent. Other indications for a change to continuous CTG after IA has been commenced include situations where the fetal heart rate cannot be detected, or heard clearly with IA, appearance of fresh and/or thick meconium, or the occurrence of maternal health complications that might compromise the fetus.

Baseline	Below 110 bpm or above 160 bpm
Decelerations	Presence of repetitive, variable, late or prolonged
Contractions	More than 5 contractions in a 10 minute period

Table 3. Abnormal findings on IA.

Recent in-depth research has resulted in the creation of an evidence based approach to the use of IA, including a decision framework[7]. Figures 5 and 6 give the details.

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Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

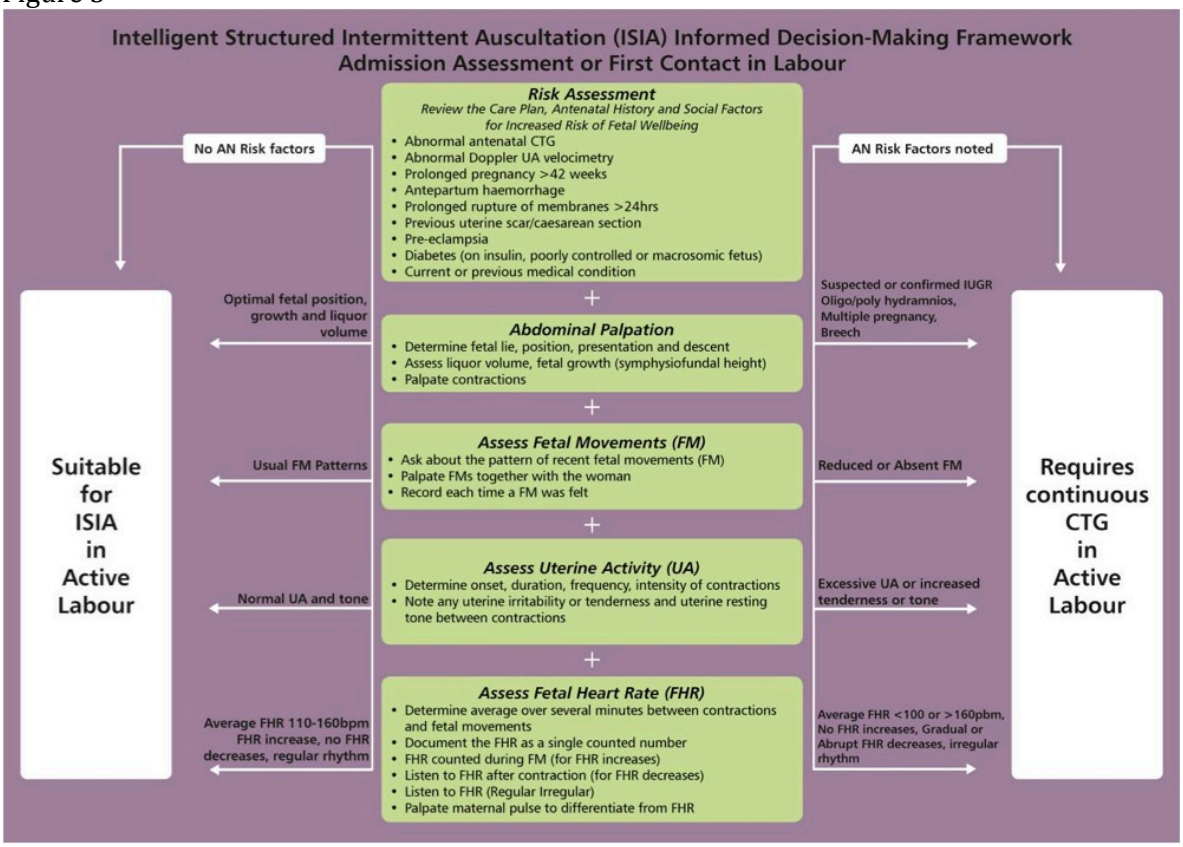
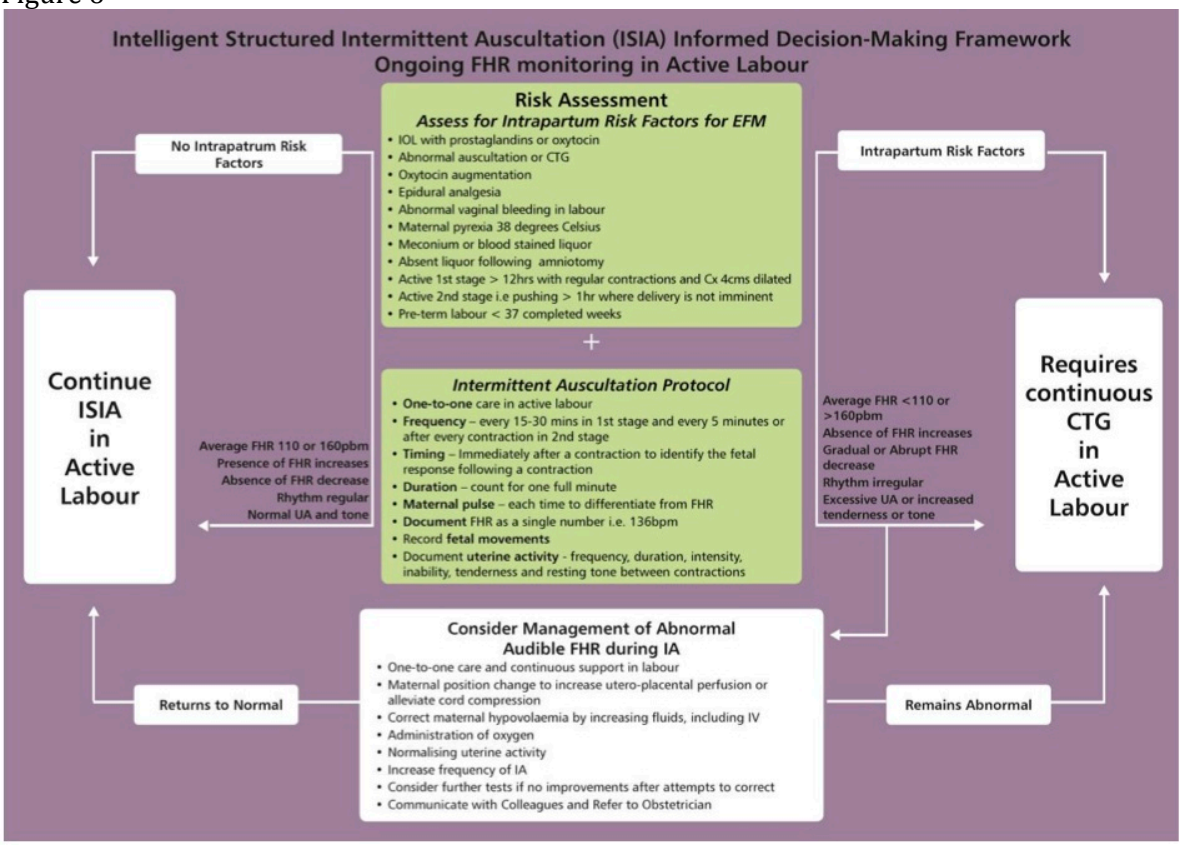


Figure 6


Intelligent Structured Intermittent Auscultation (ISIA) Informed Decision-Making Framework
Ongoing FHR monitoring in Active Labour
Risk Assessment
Assess for Intrapartum Risk Factors for EFM
• IOL with prostaglandins or oxytocin
• Abnormal auscultation or CTG
• Oxytocin augmentation
• Epidural analgesia
• Abnormal vaginal bleeding in labour
• Maternal pyrexia 38 degrees Celsius
• Meconium or blood stained liquor
• Absent liquor following amniotomy
• Active 1st stage > 12hrs with regular contractions and Cx 4cms dilated
• Active 2nd stage i.e pushing > 1hr where delivery is not imminent
• Pre-term labour < 37 completed weeks
+
Intermittent Auscultation Protocol
• One-to-one care in active labour
• Frequency – every 15-30 mins in 1st stage and every 5 minutes or after every contraction in 2nd stage
• Timing – Immediately after a contraction to identify the fetal response following a contraction
• Duration – count for one full minute
• Maternal pulse – each time to differentiate from FHR
• Document FHR as a single number i.e. 136bpm
• Record fetal movements
• Document uterine activity - frequency, duration, intensity, inability, tenderness and resting tone between contractions
No Intrapatrum Risk Factors
Intrapartum Risk Factors
Continue ISIA in Active Labour
Average FHR 110 or 160pbm
Presence of FHR increases
Absence of FHR decrease
Rhythm regular
Normal UA and tone
Average FHR <110 or >160pbm
Absence of FHR increases
Gradual or Abrupt FHR decrease
Rhythm irregular
Excessive UA or increased tenderness or tone
Requires continuous CTG in Active Labour
Consider Management of Abnormal Audible FHR during IA
• One-to-one care and continuous support in labour
• Maternal position change to increase utero-placental perfusion or alleviate cord compression
• Correct maternal hypovolaemia by increasing fluids, including IV
• Administration of oxygen
• Normalising uterine activity
• Increase frequency of IA
• Consider further tests if no improvements after attempts to correct
• Communicate with Colleagues and Refer to Obstetrician
Returns to Normal
Remains Abnormal