ASSESSMENT OF THE FETUS

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When to start fetal Assessment

** Risk assessed individually

**For D.M. fetal assessment should start from 32 weeks onward if uncomplicated

***If complicated D.M. start at 24 weeks onward

**For Post date pregnancy start at 40 weeks

**For any patient with decrease fetal movement start immediately

** Fetal assessment is done once or twice weekly

CONDITIONS ASSOCIATED WITH INCREASED PERINATAL MORBIDITY/MORTALITY WHERE ANTENATAL FETAL TESTING MAY HAVE AN IMPACT

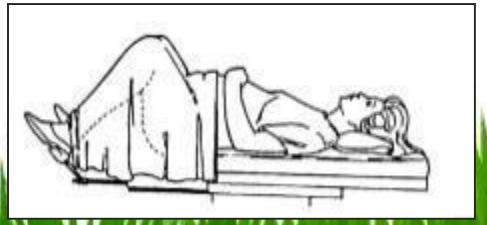
Small for gestational age fetus
Decreased fetal movement
Postdates pregnancy (>294 days)
Pre-eclampsia/chronic hypertension
Pre-pregnancy diabetes
Insulin requiring gestational diabetes
Preterm premature rupture of membranes
Chronic (stable) abruption

METHODS OF ASSESSMENT

- Assessment of Uterine growth
- Fetal movement counting
- Non stress test- indicator of fetal health.
- Contraction stress test – indicator of U.P func.
- Fetal Biophysical profile
- Modified Biophysical profile
- Doppler velocimetry
- Percutaneous umbilical blood sampling

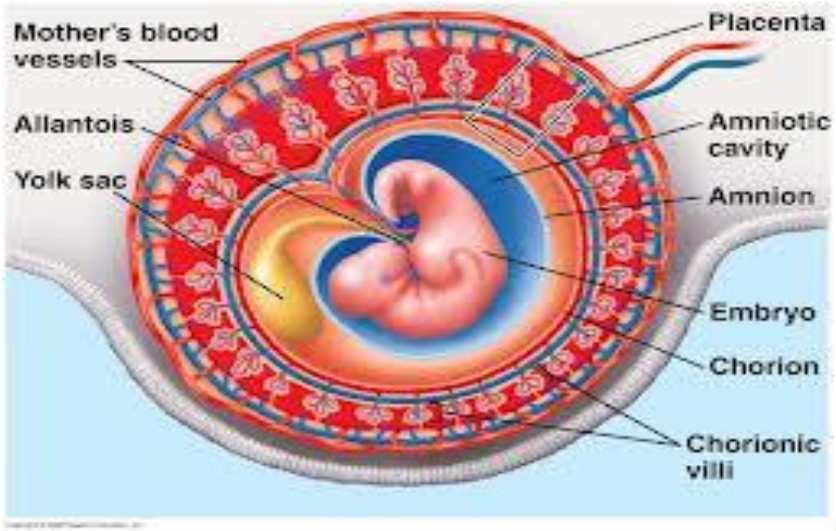
Ultrasound

- **High frequency sound waves (Real time scanning)**
- **Advantages** - early detection of fetal anomalies, accurate determination of gestation, noninvasive and painless, no known harmful effects, use at any time during pregnancy
- Types
  - **Transabdominal US-** need full bladder, if not full drink 3-4 8oz glasses and rescan
  - **Endovaginal US- probe is inserted into vagina (closer to structures) same preparation. Lithotomy position.**



❑ **Obstetric ultrasound examination at any stage in pregnancy serves two important functions: Diagnostic and Screening.**

❑ **While many major fetal defects can be diagnosed in the first trimester, the diagnostic accuracy of an ultrasound scan is significantly greater in the mid-second trimester due to the larger size and more advanced development of the fetus**



1st TRIMESTER SCAN

The First Trimester is defined as the first 12 weeks of pregnancy following the last normal menstrual period (some authors refer to early pregnancy as 0 – 10 weeks).

It can be divided into a number of phases, each of which has typical clinical issues. These phases are:

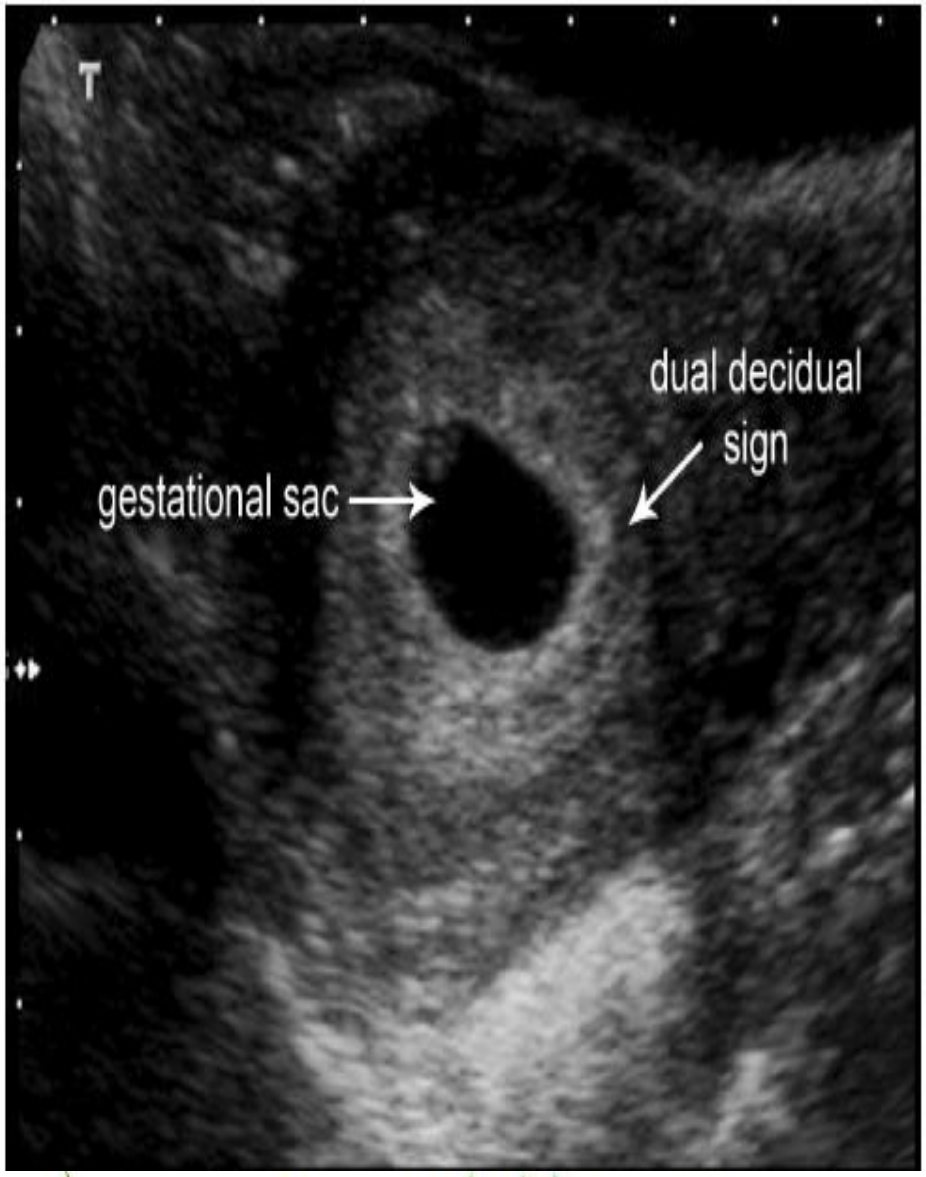
Conceptus phase : 3 – 5 weeks

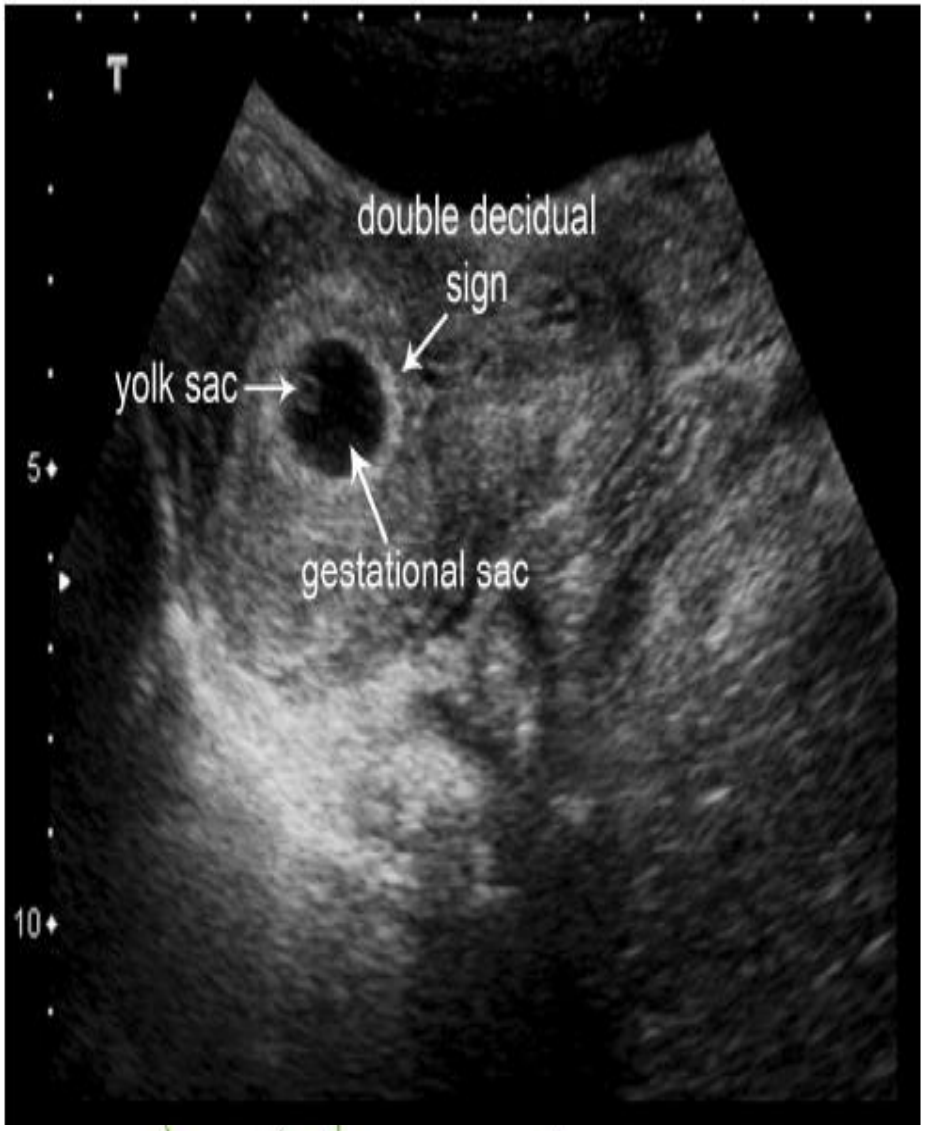
Embryonic phase : 6 – 9 weeks

Fetal phase : 10 – 12 weeks

Uses of ultrasound in the 1st trimester

1. Dating of the pregnancy
   - MSD : mean sac diameter
   - CRL : crown rump length (most accurate)
2. Early pregnancy failure
   - Threatened abortion
   - Missed abortion
   - Inevitable abortion
   - Incomplete abortion
   - Complete abortion
   - An-embryonic pregnancy / Blighted Ovum
3. Confirming intrauterine pregnancy (IUP)
   - Double Decidual Sac Sign
   - Intradecidual Sign
   - Double Bleb Sign
4. Ectopic pregnancy
5. Nuchal lucency


T
dual decidual
sign
gestational sac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double decidual
sign
yolk sac
5
gestational sac
10

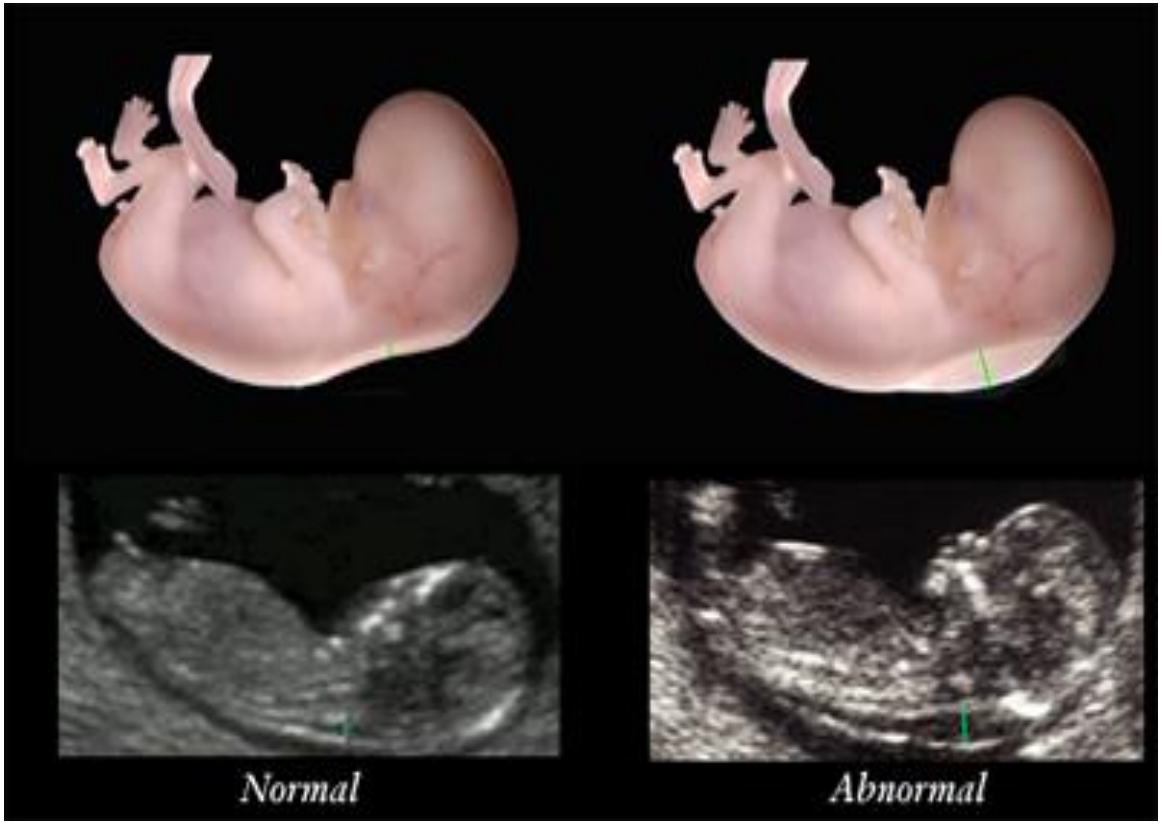
Outside to Outside Measurements

NUCHAL TRANSLUCENCY

The **Nuchal Translucency** is a measurement performed during a specific period in the first trimester (11.3-13.6 weeks).

It should not be confused with **Nuchal Thickness** which is measured in the second trimester.

An increased nuchal translucency is thought to relate to dilated lymphatic channels.


Normal
Abnormal

Harmful Effects of ultrasound in pregnancy:

- It is not ionising radiation
- However, thermal effects and cavitation can occur in tissues exposed to high power ultrasound
- A meta analysis showed males exposed to ultrasound in uterus are more likely to be left-handed

2ND & 3RD TRIMESTER SCANNING

2nd trimester scan is a routinely performed ultrasound examination on all pregnancies .

This scan emphasizes on fetal anatomy and therefore is also called a

2nd Trimester Anatomy Scan

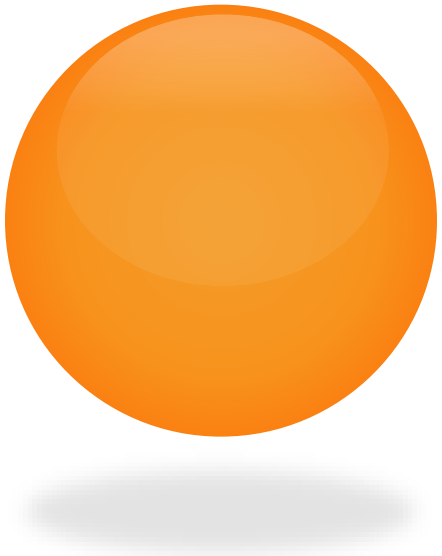
OR

Fetal Anomaly Scan

OR

TIFFA (Targeted Imaging For Fetal Anomalies) Scan.

Period extends from 13 weeks 0 days to 27 weeks 6 days



AMNIOTIC FLUID INDEX (AFI)

- The amniotic fluid index (AFI) is an estimate of the amniotic fluid volume in a fetus.

- It is measured by adding the values of individual amniotic pocket depths (in cm's) for each of the four quadrants

- Care should be taken that the pocket chosen is free from the cord or any fetal part or placental tissue.

- It is part of the fetal biophysical profile.

The normal range for amniotic fluid volumes varies with gestational age.

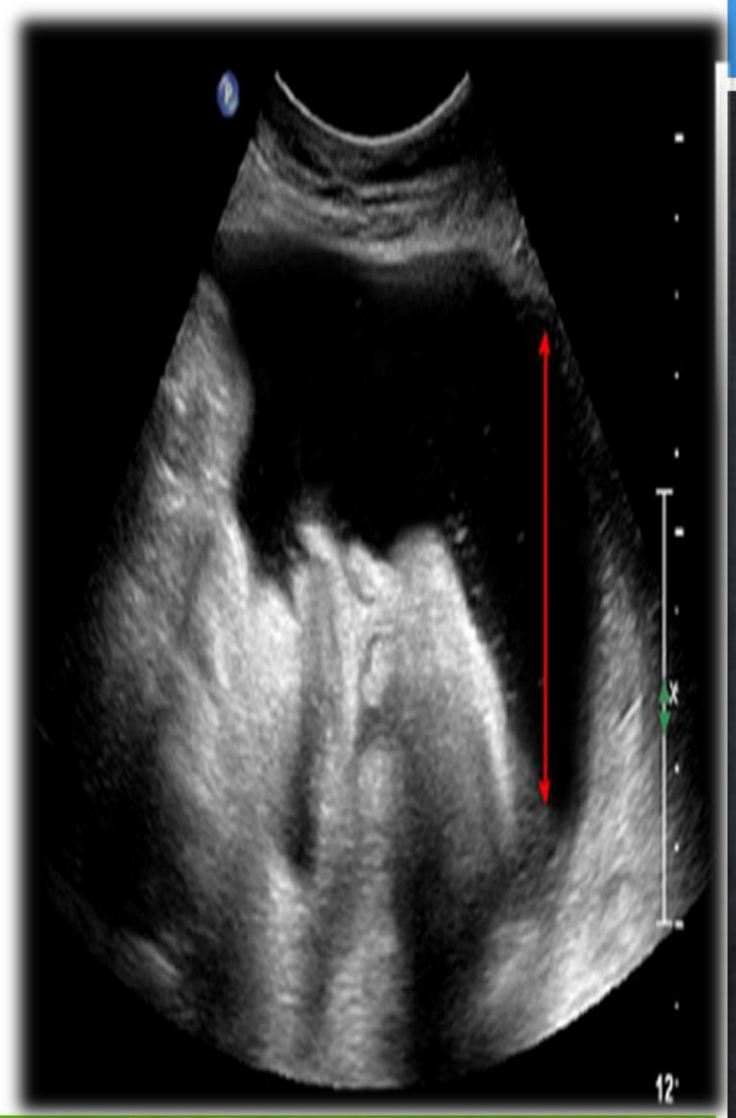
As a rule of thumb :

- AFI of < 5 implies Oligohydramnios
- AFI of > 25 implies Polyhydramnios

MAXIMAL VERTICAL POCKET METHOD

Considered a reliable method for assessing the amniotic fluid volume on ultrasound.

It is performed by assessing a maximal depth of amniotic fluid which is free of umbilical cord.



Usually accepted values are

< 2 cm : Oligohydramnios

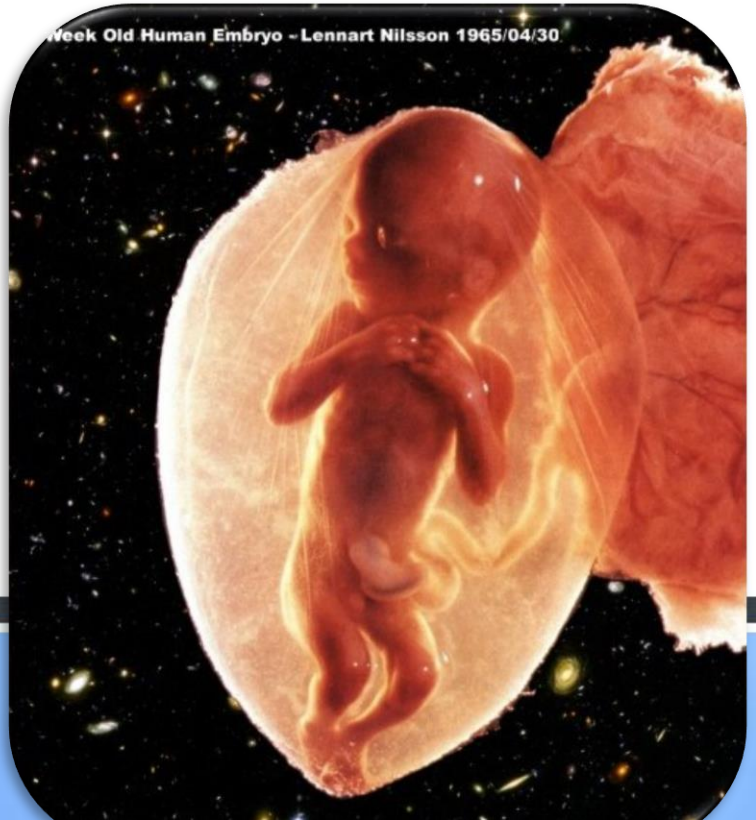
2 - 8 cm : Normal

but should be taken in the context of subjective volume

> 8 cm : Polyhydramnios

MATERNAL PERCEPTION OF REDUCTION IN MOVEMENTS MAY BE A RED FLAG SIGN TO IMPENDING FETAL DISTRESS.

FETAL MOVEMENT COUNTING



Fetal movement counting

Cardiff technique:

*Done in the morning, patient should

*calculate how long it takes to have 10 fetal movement

**10 movements should be appreciated in 12 hours

Fetal movement counting

Sadovsky technique:

-For one hour after meal the woman should lie down and concentrate on fetal movement

-4 movement should be felt in one hour

-If not , she should count for another hour

-If after 2 hours four movements are not felt, she should have fetal monitoring

Factors influencing maternally perceived fetal movements

Maternal

- Activity
- Obesity
- Ingestion of medications or drugs that depress (e.g., methadone) or increase (e.g., cocaine) fetal movements

Fetal

- Behavioral states
- Gestational age
- Congenital anomalies (e.g., neuromuscular disorders, fetal akinesia
- syndrome)
- Duration of fetal movements

Uterine

- Placental location
- Amniotic fluid volume

Dangers of decrease fetal movement

- 35% risk of Stillbirths
- Poor neonatal condition at birth :

1. Abnormal labor FHR patterns
2. Cesarean for fetal distress
3. 5-min Apgar scores ≤ 6.

- Fetal growth restriction was almost 10 times higher than that of the active group

NON STRESS TEST

1. Most commonly used test. The patient placed in left lateral position.

2. Non invasive, easy to perform, interpret and readily accepted by patients.

3. Test looks for presence of fetal heart rate (FHR) accelerations associated with fetal movements.

4. This reflex involves the cerebral cortex, and is affected by physiological (fetal sleep) or pathological influences (fetal hypoxia) on fetal brain.

Non stress test

*The base line 110-150 beats/minute

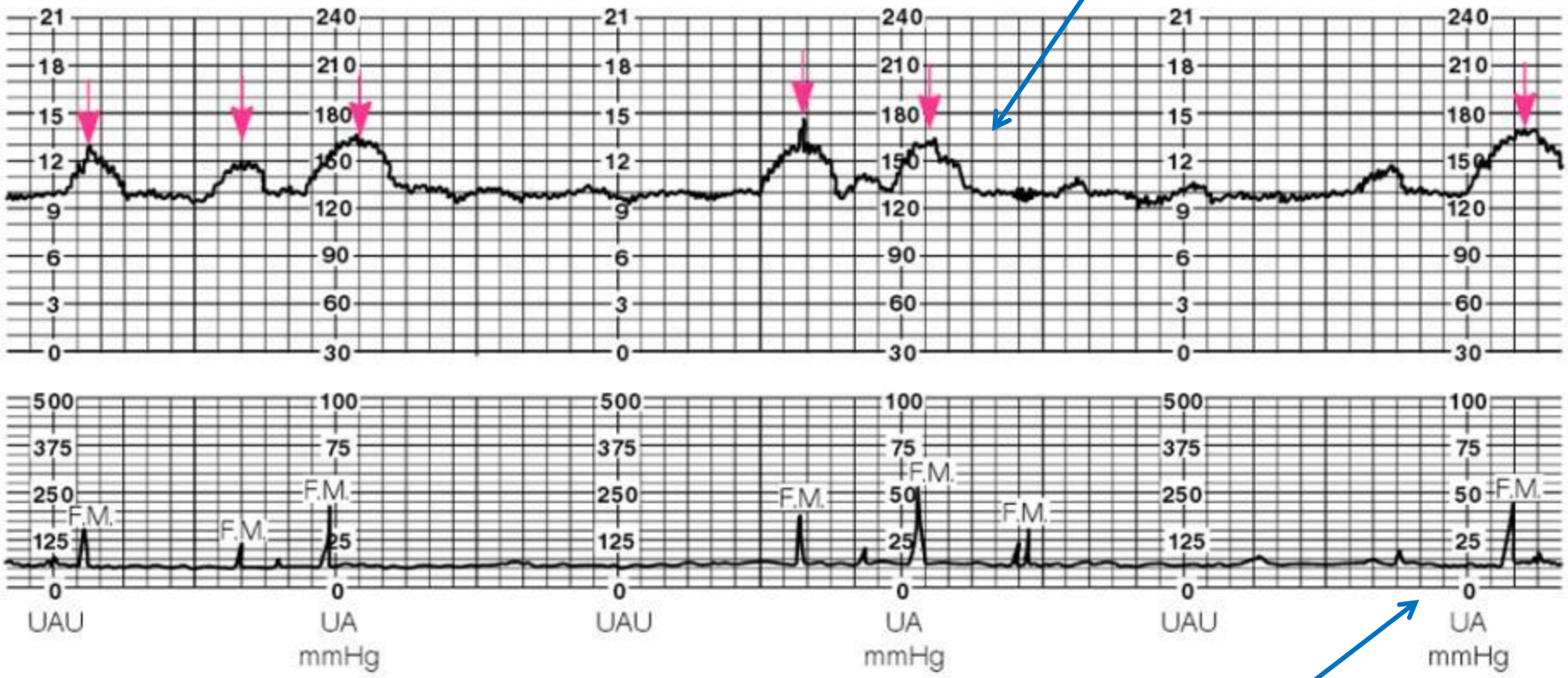
***Reactive**:

At least two accelerations from base line of 15 bpm for at least 15 sec within 20 minutes

Non reactive:

No acceleration after 20 minutes- proceed for another 20 minutes

incr of about 15 bmp lasting 15 sec desired



Fetal Movement

Figure 14–5 Example of a reactive nonstress test (NST). Accelerations of 15 bpm lasting 15 seconds with each fetal movement (FM). Top of strip shows FHR; bottom of strip shows uterine activity tracing. Note that FHR increases (above the baseline) at least 15 beats and remains at that rate for at least 15 seconds before returning to the former baseline.

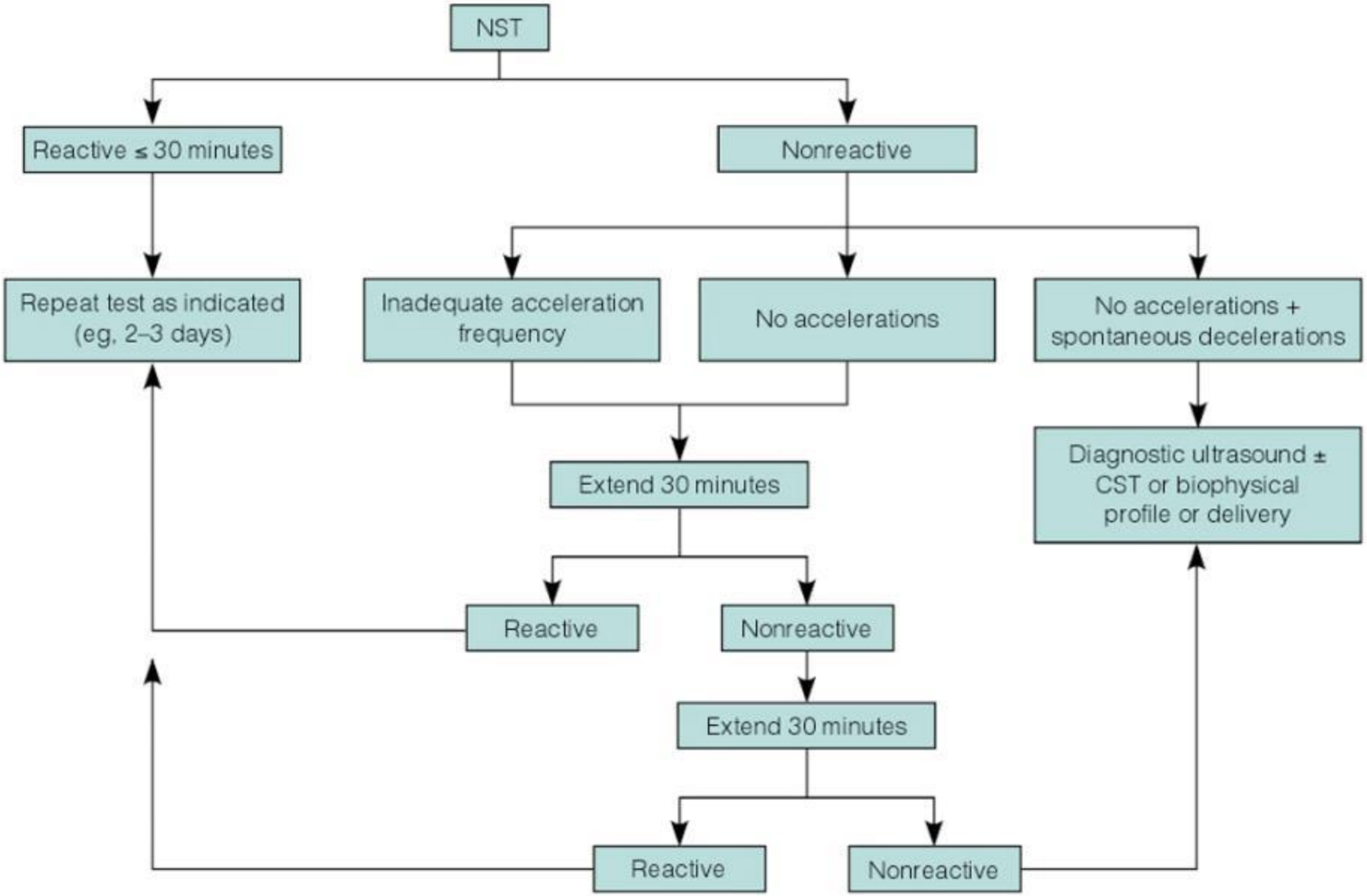
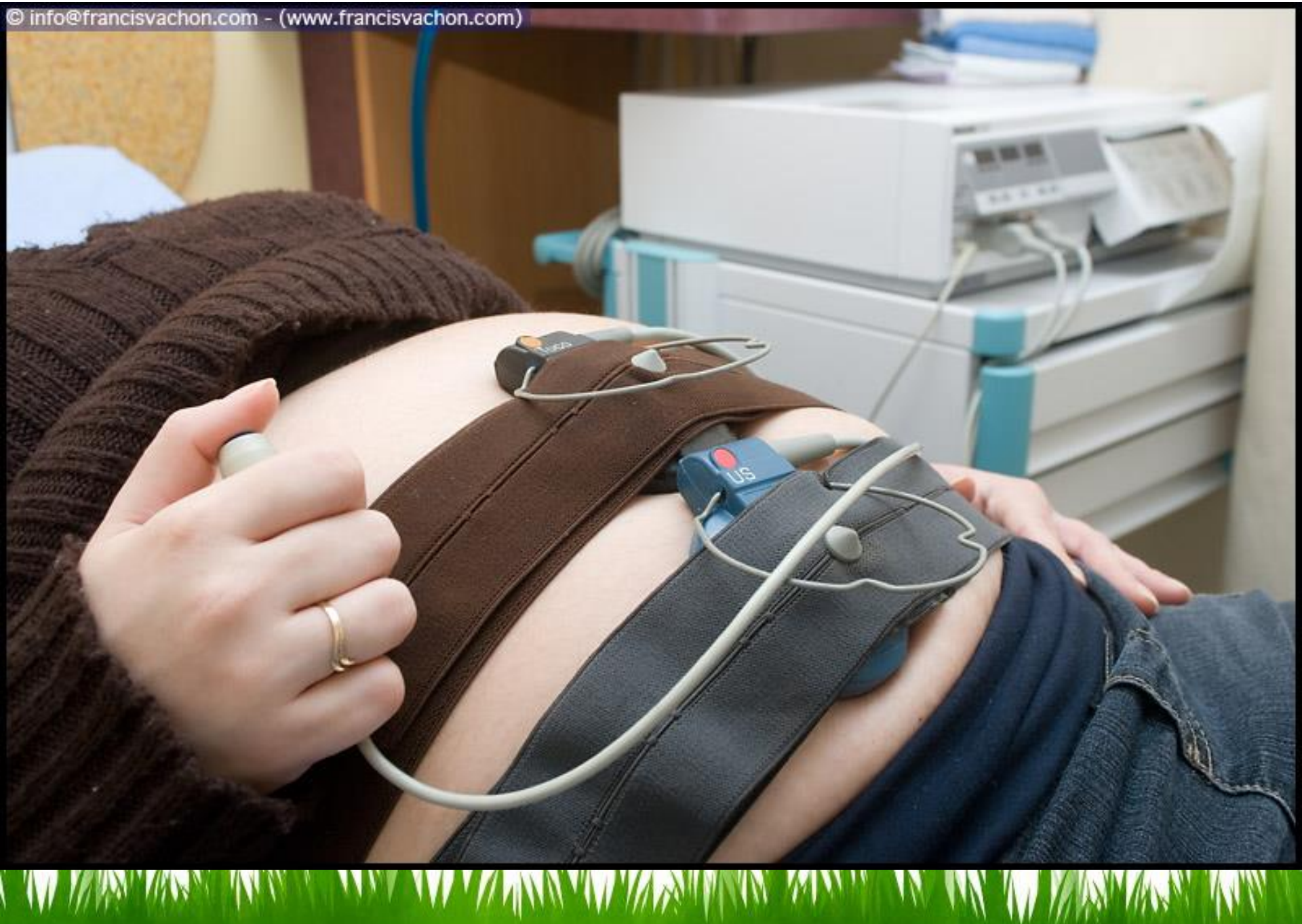


Figure 14–7 NST management scheme. *Source:* Devoe, L. D. (1989). Nonstress and contraction stress testing. In R. Depp, D. A. Eschenbach, & J. J. Sciarri (Eds.), *Gynecology and obstetrics* (Vol. 3, p. 9, Figure 5). Philadelphia: Lippincott.

Fetal Acoustic & Vibroacoustic Stimulation

Used as an adjunct to the NST "**Define: NST-** A test to assess the health of the fetus by monitoring the fetal heart rate in response to fetal movement."

- Handheld device that generates a low frequency vibration and buzzing sound
- Applied to maternal abdomen for 2-5 seconds up to 3 times
- Stimulates fetal movement - acceleration of FHR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Contraction stress test

1. Fetal response to induced stress of uterine contraction and relative placental insufficiency

2. Should not be used in patients at risk of preterm labor or placenta previa

3. Should be proceeded by NST

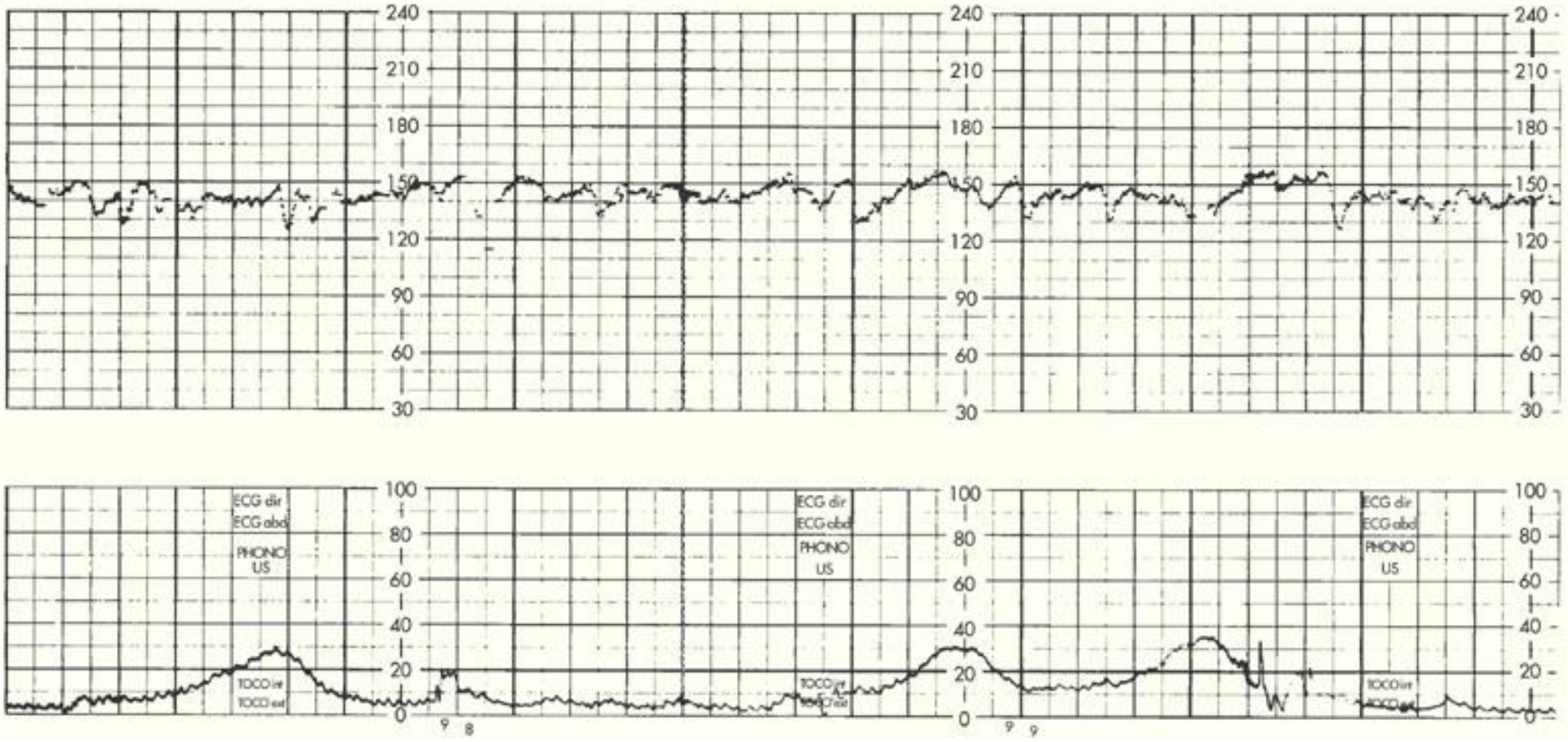
Contraction Stress Test

- **Evaluates the Respiratory function of the placenta**
  - **Does it get O^2 to the baby? Test to check if the placenta has the reserves needed during contractions.**
- **Records FHR response to stress of uterine contractions**
  - **Compress arteries to placenta**

- Uterine Contractions **induced by nipple stimulation** or Oxytocin (Caution: may cause pt to go into labor!)

- **Interpretation**
  - **Negative** – 3 good contractions lasting 40 seconds in 10 minute interval with no late decelerations
  - **Positive – persistent late decelerations with more than 50% of the contractions (NOT THE DESIRED RESULTS)**

Ex: CST “Contraction Stress Test”



Negative CST.

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example of positive CST.

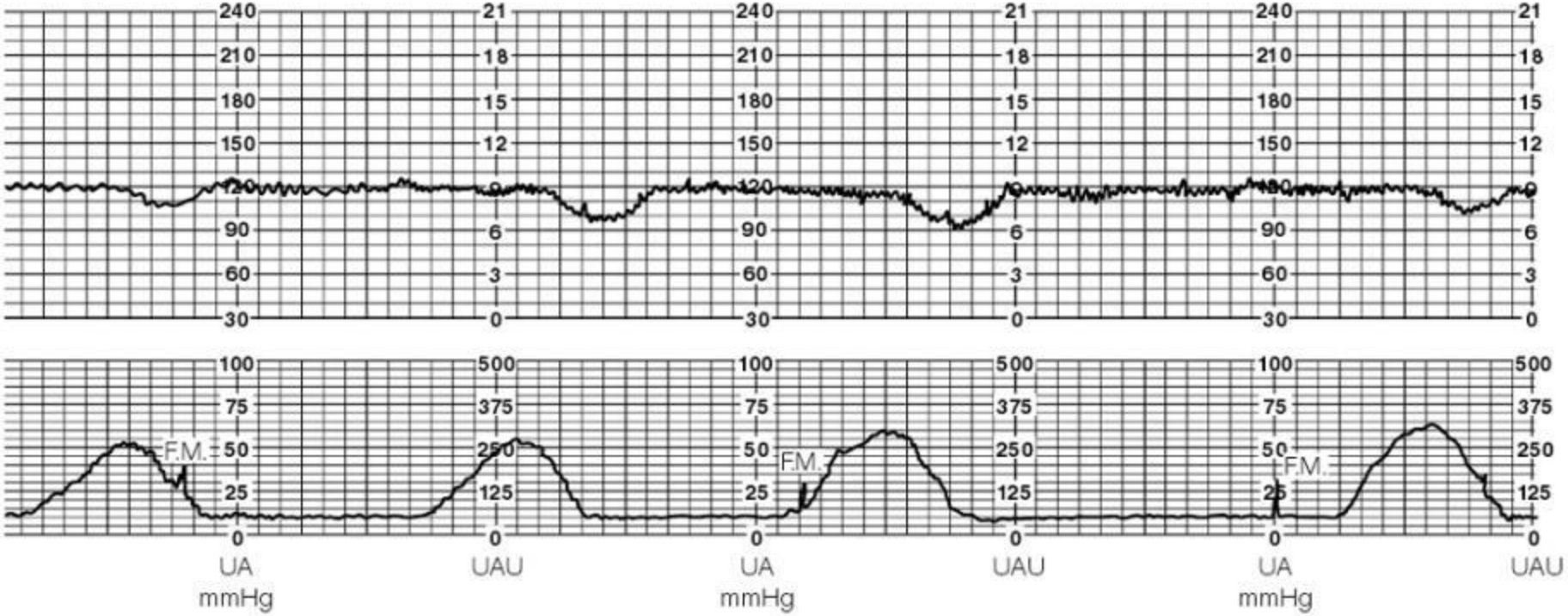


Figure 14–8 Example of a positive contraction stress test (CST). Repetitive late decelerations occur with each contraction. Note that there are no accelerations of FHR with three fetal movements (FM). The baseline FHR is 120 bpm. Uterine contractions (bottom half of strip) occurred four times in 12 minutes.

Interpretation of CTG

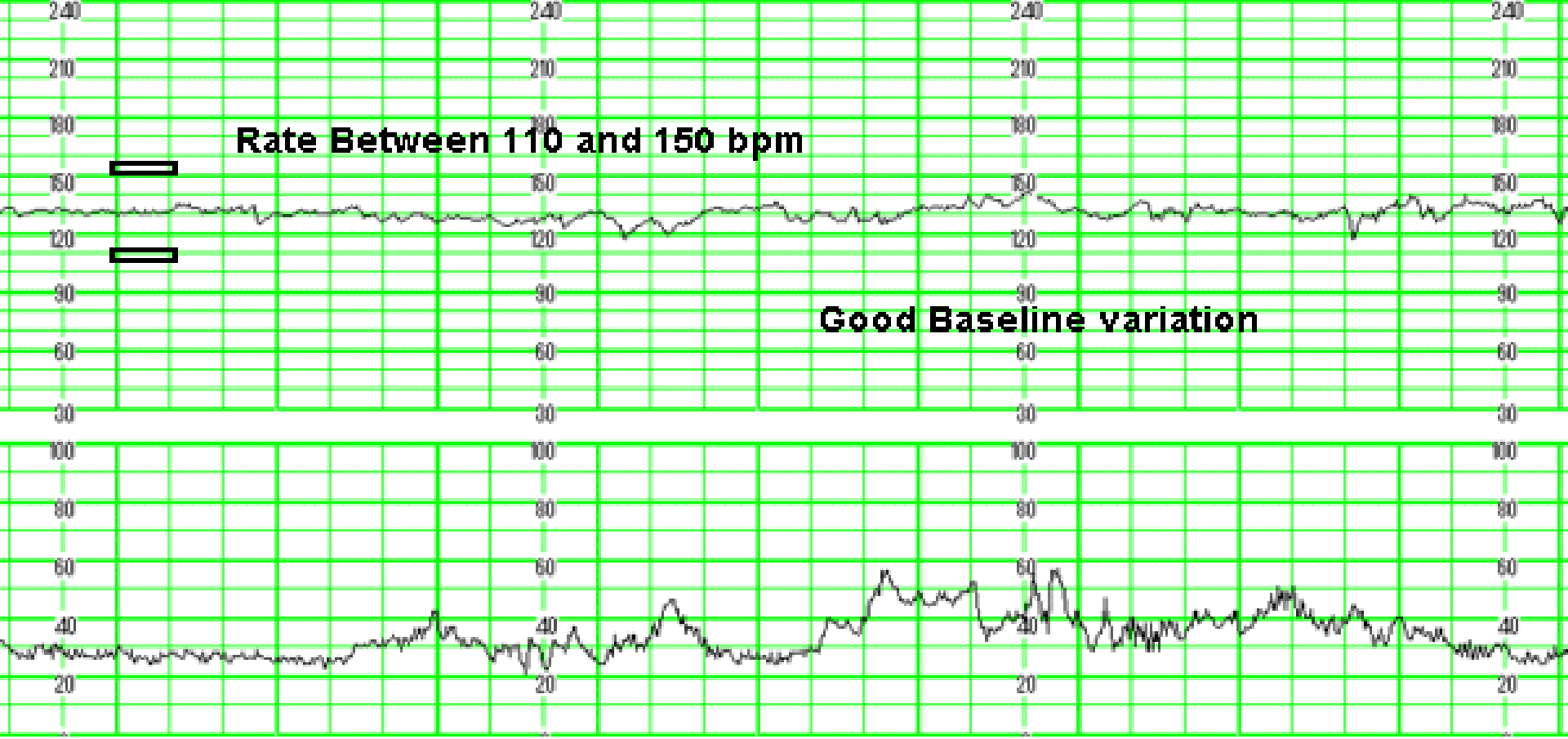
Normal Baseline FHR 110-150 bpm

– Moderate bradycardia 100–109 bpm

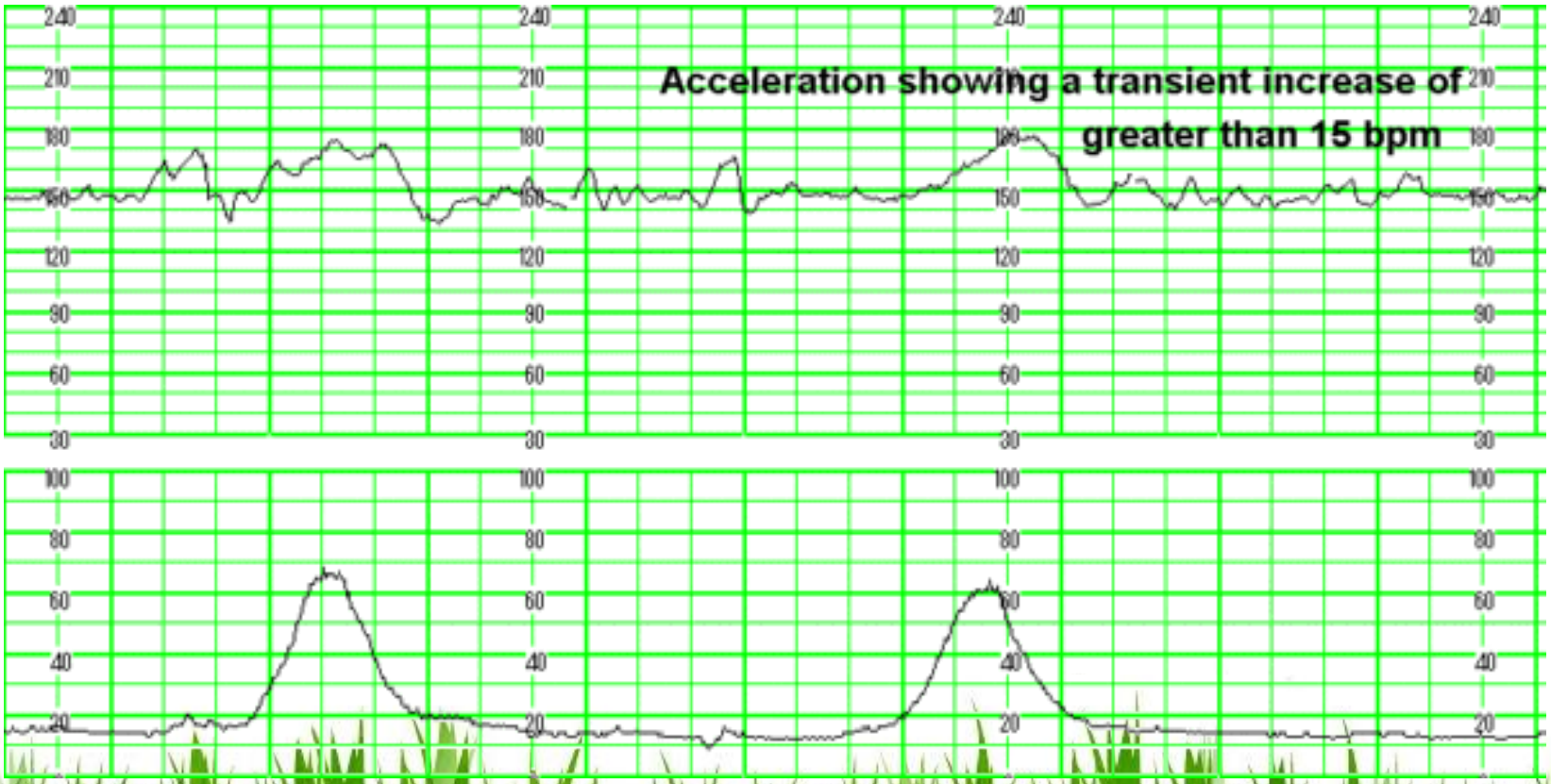
– Moderate tachycardia 161–180 bpm

– Abnormal bradycardia < 100 bpm

– Abnormal tachycardia > 180 bpm


Rate Between 110 and 150 bpm
Good Baseline variation

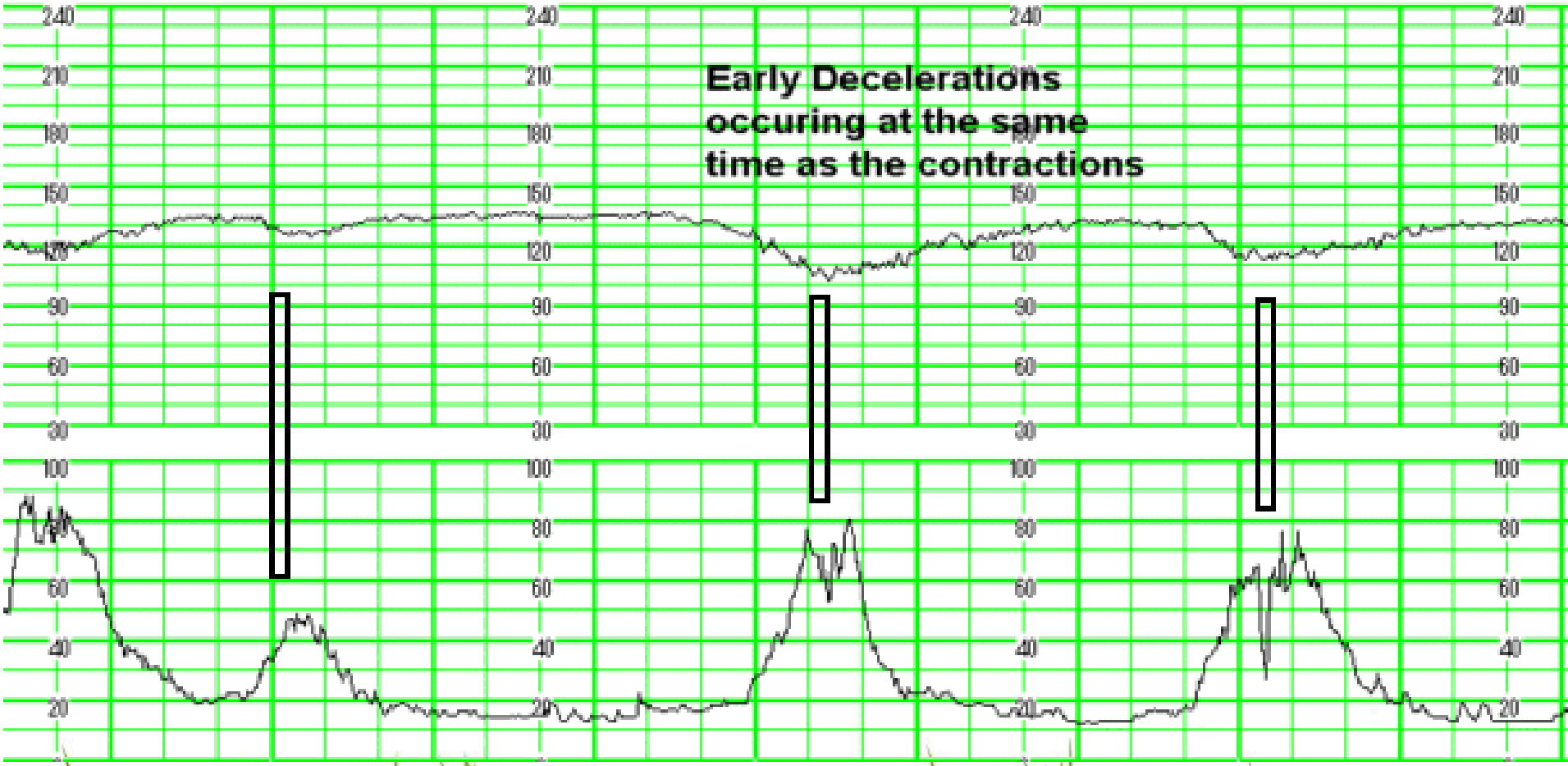
Acceleration



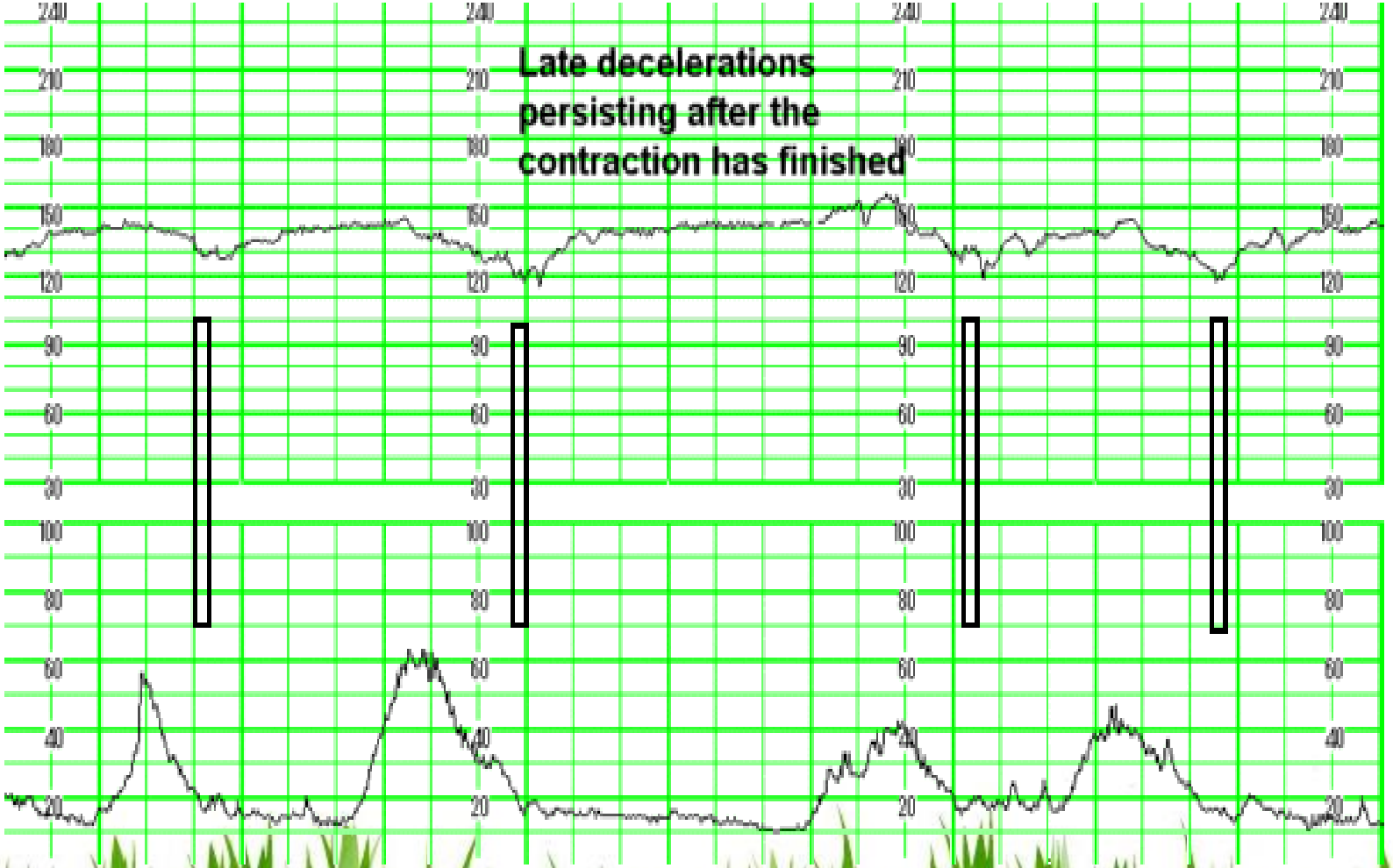
Deceleration

- EARLY : Head compression
- LATE : U-P Insufficiency
- VARIABLE : Cord compression
  Primary CNS dysfunction

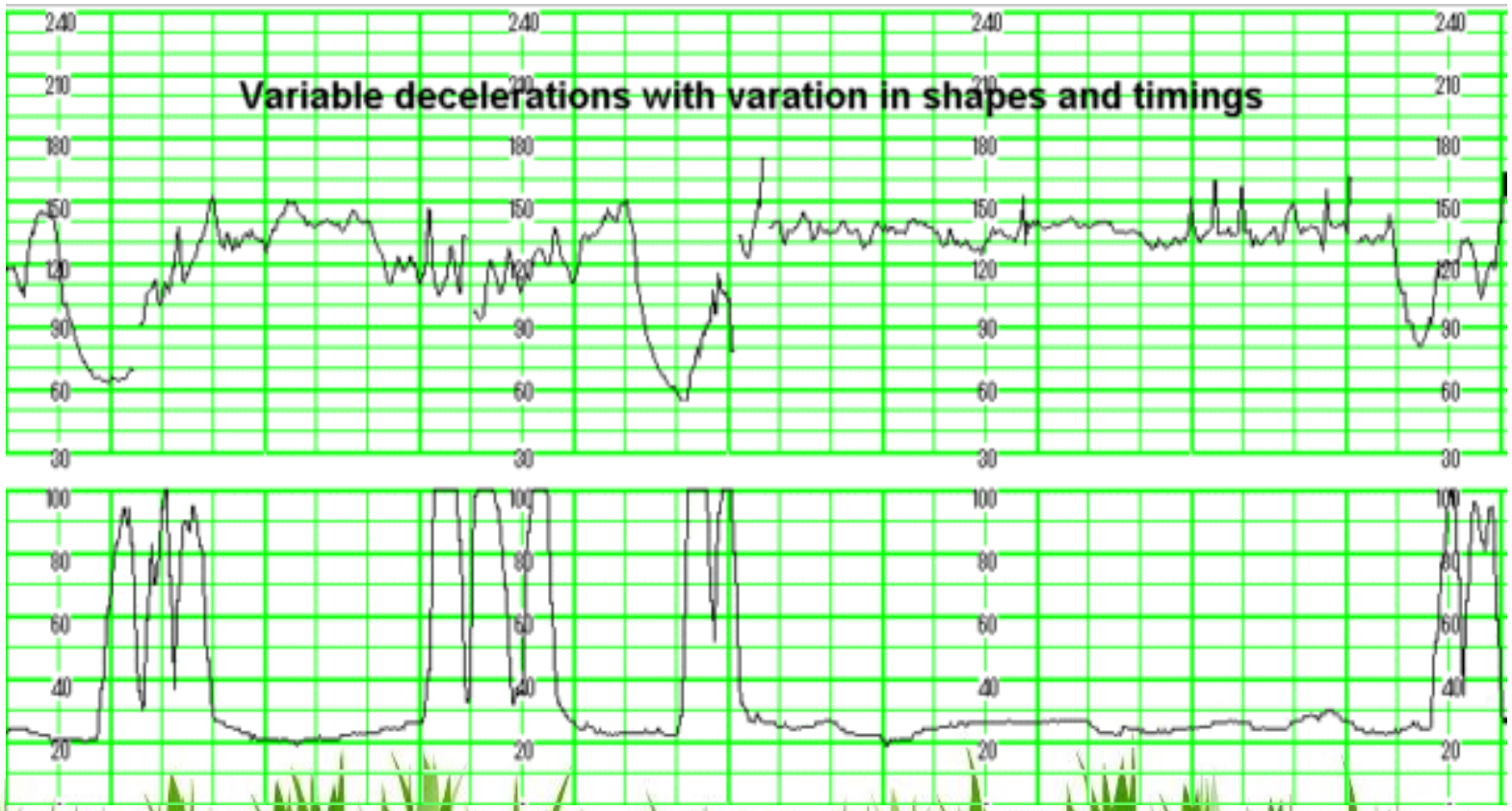
Early deceleration



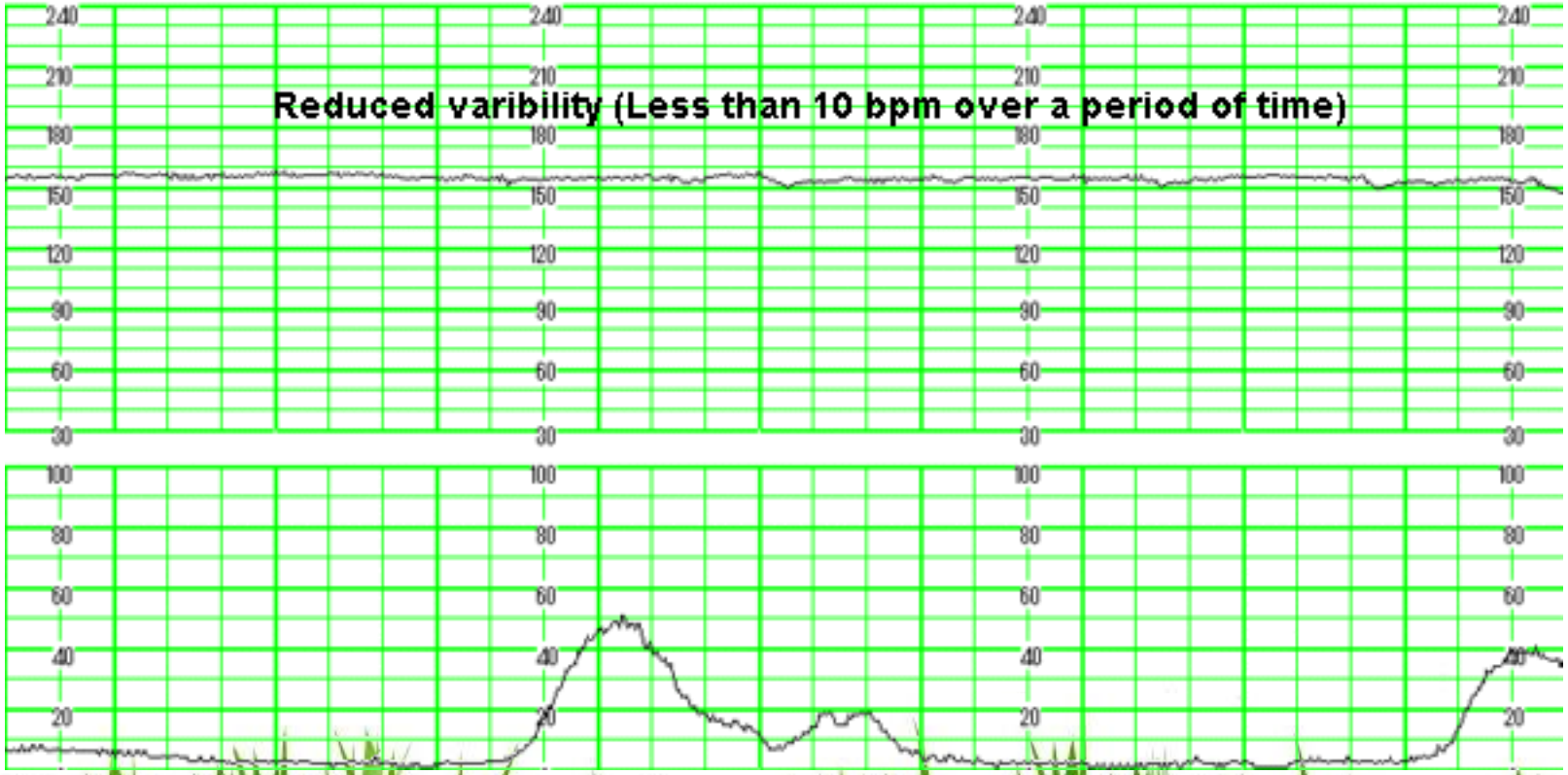
Late deceleration



Variable Deceleration



Reduced Variability



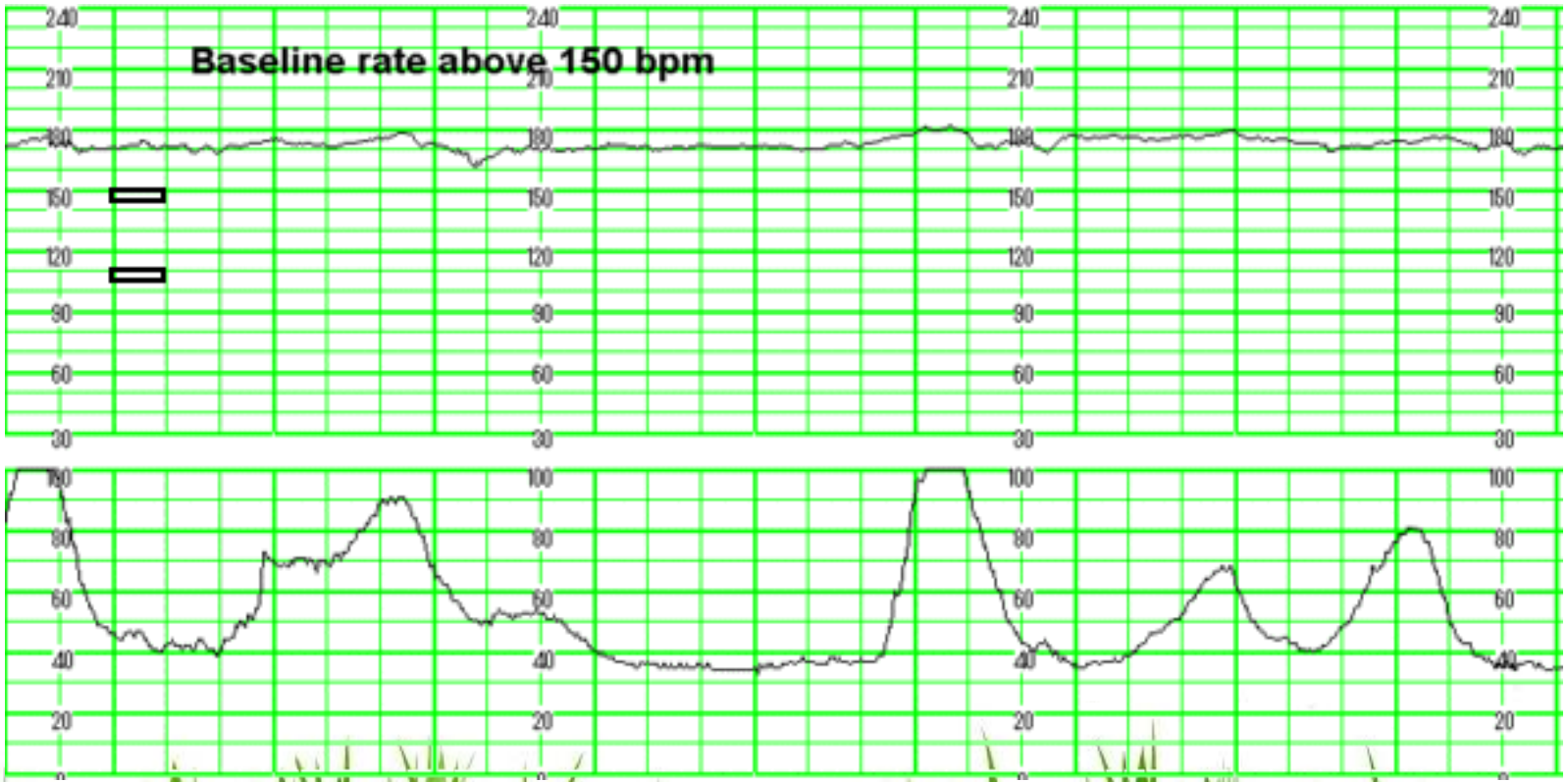
Tachycardia

Hypoxia

Chorioamnionitis

Maternal fever B-Mimetic drugs

Fetal anaemia,sepsis,ht failure,arrhythmias



Ultrasound fetal assessment

- Assessment of growth
- Biophysical profile (BPP)

Assessment of fetal growth by ultrasound

Biometry:

Biparietal diameter (BPD)

Abdominal Circumference (AC)

Femur Length (FL)

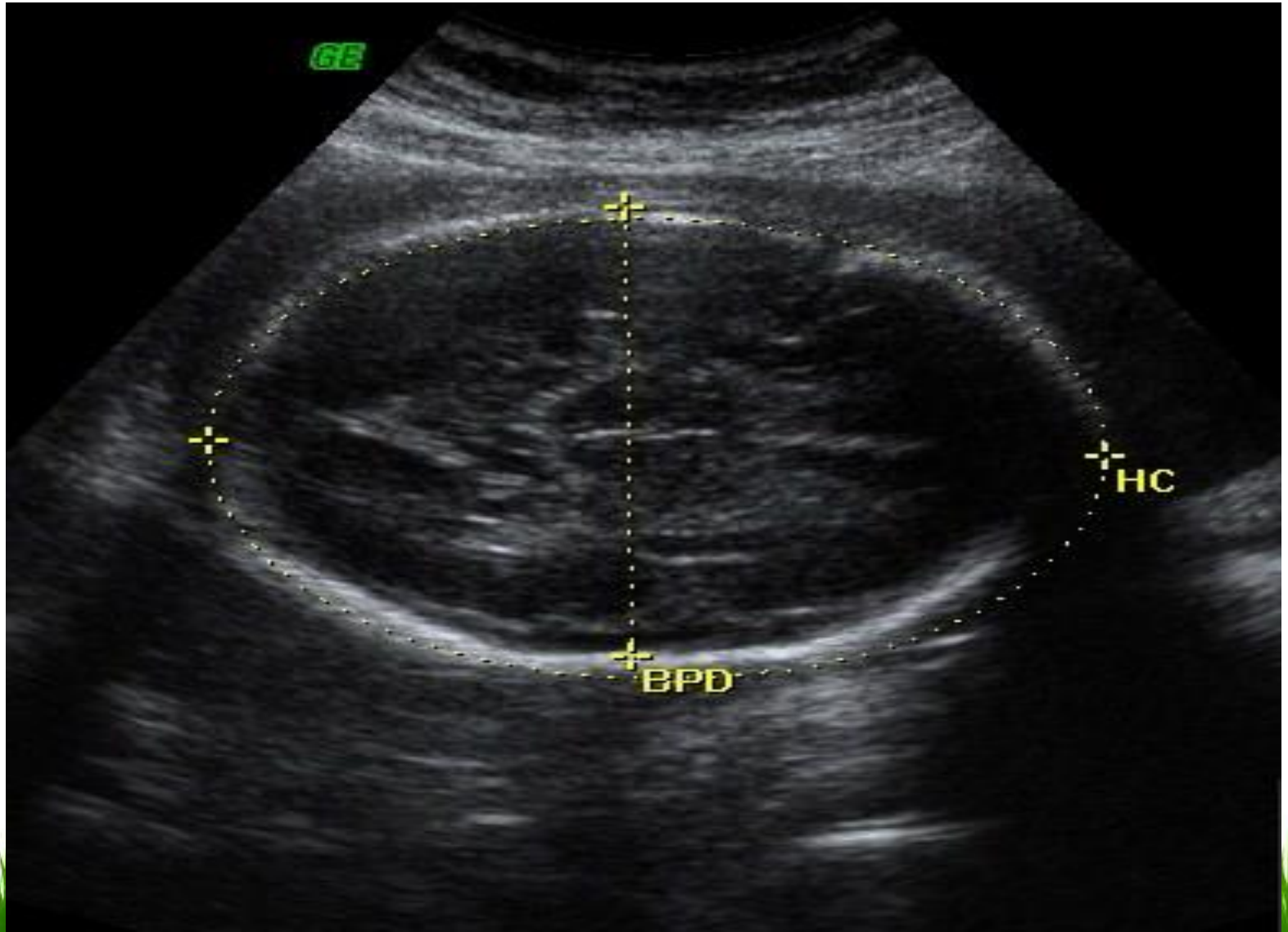
Head Circumference (HC)

Amniotic fluid

- **Placental localization**

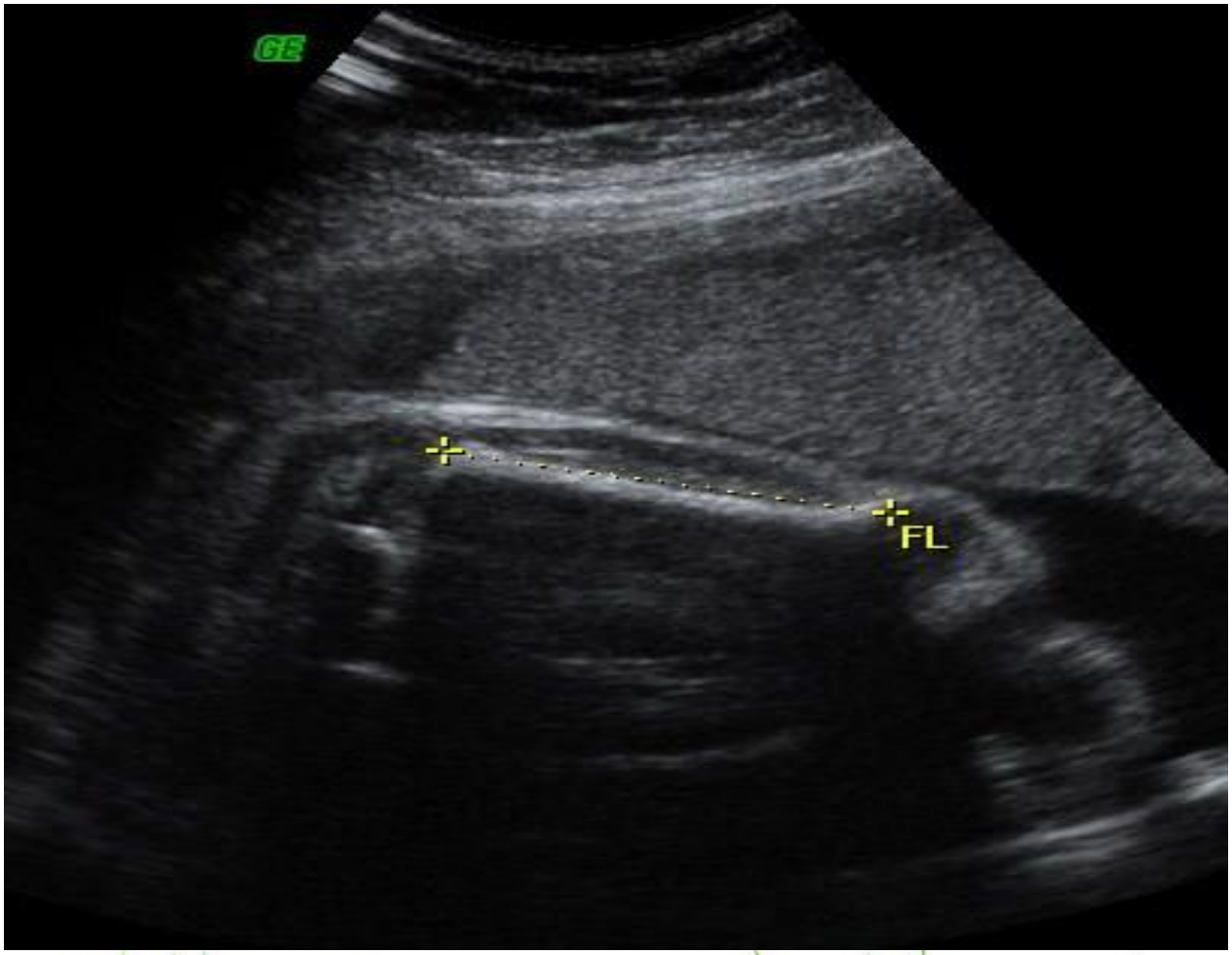
BPD

BPD & HC

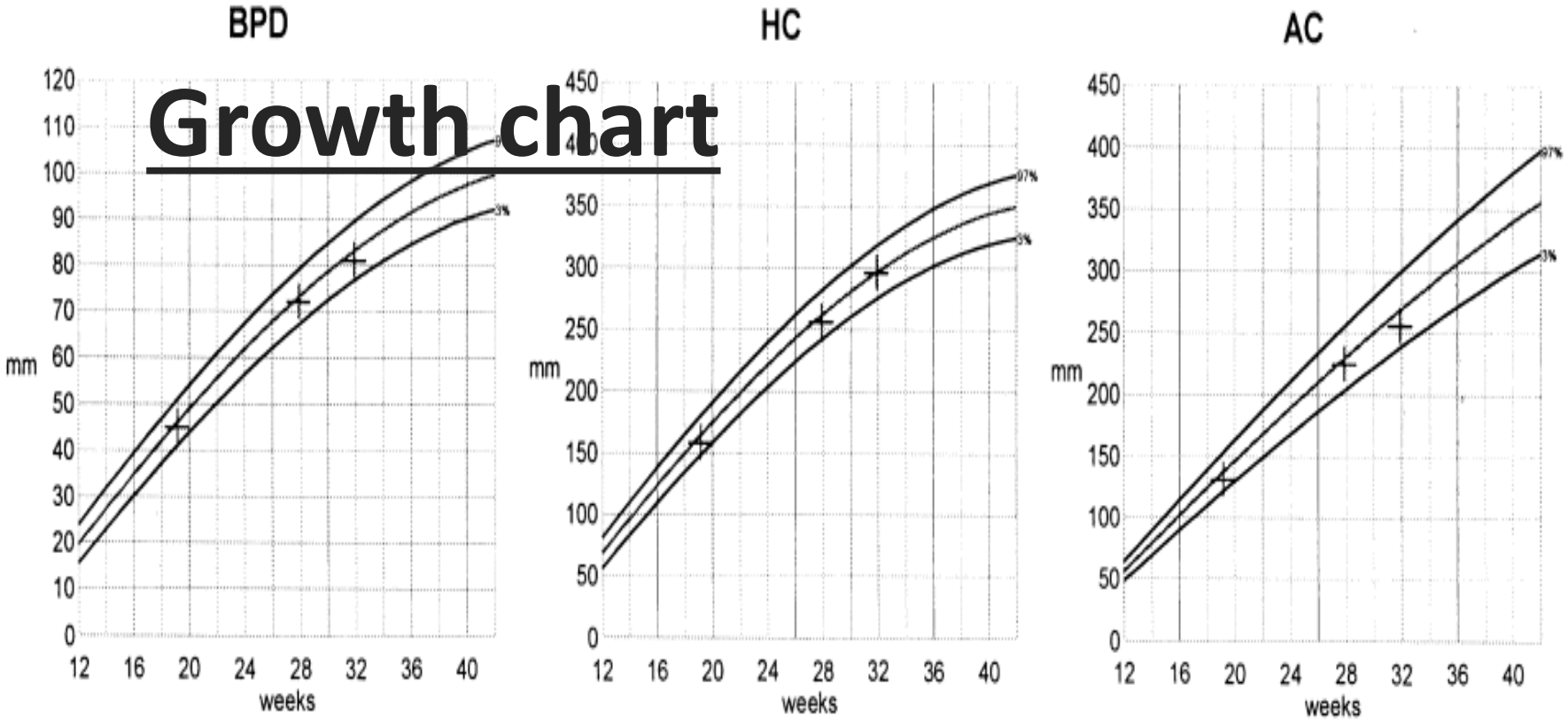


Abdominal circumference

FL



Growth chart



Fetal Biophysical profile

Biophysical Variable	Normal (score=2)	Abnormal (score= 0)
Fetal breathing movements	1 episode FBM of at least 30 s duration in 30 min	Absent FBM or no episode >30 s in 30 min
Fetal movements	3 discrete body/limb movements in 30 min	2 or fewer body/limb movements in 30 min
Fetal tone	1 episode of active extension with return to flexion of fetal limb(s) or trunk. Opening and closing of the hand considered normal tone	Either slow extension with return to partial flexion or movement of limb in full extension Absent fetal movement
Amniotic fluid volume	1 pocket of AF that measures at least 2 cm in 2 perpendicular planes	Either no AF pockets or a pocket<2 cm in 2 perpendicular planes

Test Score Result	Interpretation	Management
10 of 10 8 of 10 (normal fluid) 8 of 8 (NST not done)	Risk of fetal asphyxia extremely rare	Intervention for obstetric and maternal factors
8 of 10 (abnormal fluid)	Probable chronic fetal compromise	Determine that there is functioning renal tissue and intact membranes. If so, delivery of the term fetus is indicated. In the preterm fetus less than 34 weeks, intensive surveillance may be preferred to maximize fetal maturity.
6 of 10 (normal fluid)	Equivocal test, possible fetal asphyxia	Repeat test within 24 hr
6 of 10 (abnormal fluid)	Probable fetal asphyxia	Delivery of the term fetus. In the preterm fetus less than 34 weeks, intensive surveillance may be preferred to maximize fetal maturity
4 of 10	High probability of fetal asphyxia	Deliver for fetal indications
2 of 10	Fetal asphyxia almost certain	Deliver for fetal indications
0 of 10	Fetal asphyxia certain	Deliver for fetal indications

Umbilical Doppler Velocimetry

Indication:

IUGR

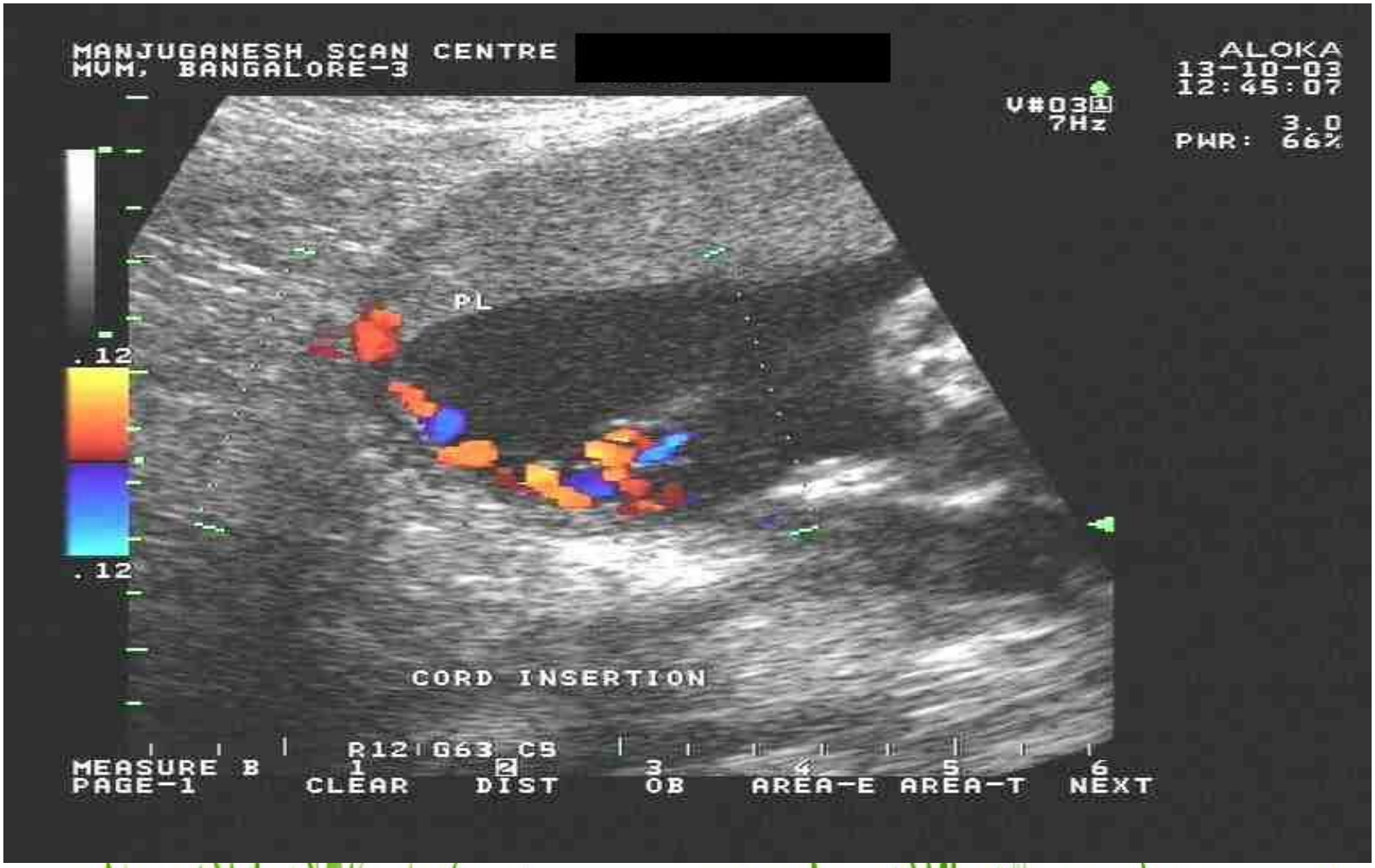
PET

D.M.

Any high risk pregnancy

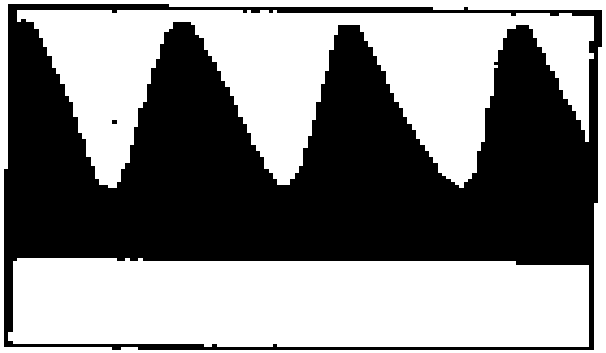
Use a free loop of umbilical cord to measure blood flow in it

Umbilical cord

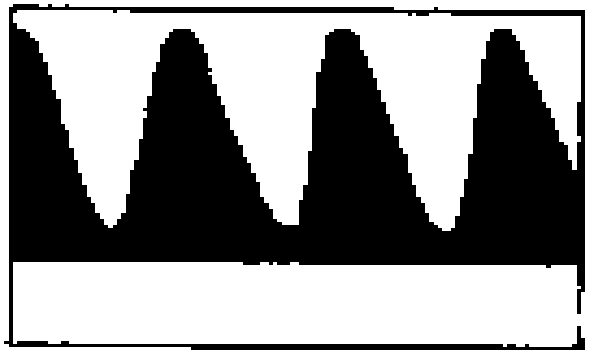



Umbilical Cord Doppler

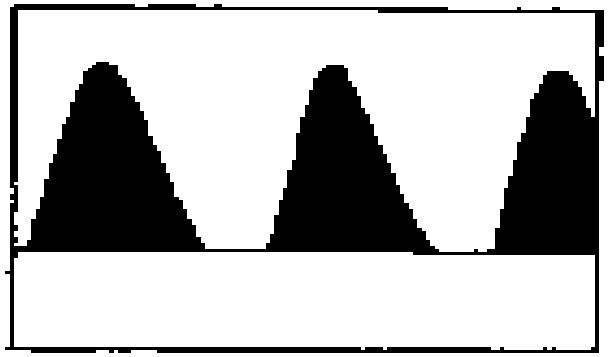
Umbilical Artery Doppler



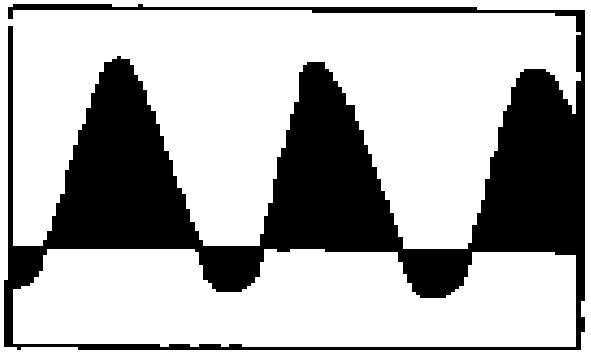
Normal pregnancy



Reduced end diastolic velocity



Absent end diastolic velocity



Reversed end diastolic velocity

Management of abnormal Doppler

Depends on:

- fetal maturity
- gestational age
- Obstetric history

Management of Doppler results

Reverse flow or absent end diastolic flow--- Immediate delivery

High resistance index---- repeat in few days or delivery

Normal flow---- repeat in 2 week if indicated


THANK
YOU!