Intrapartum fetal monitoring

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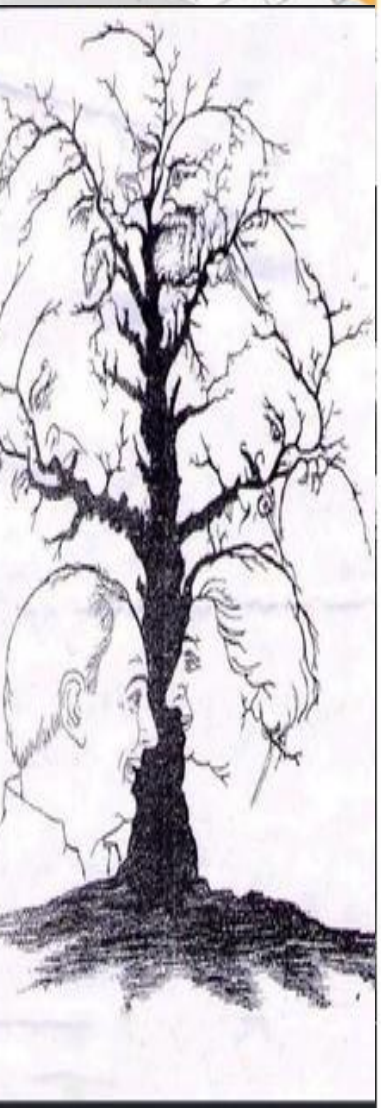


CTG features

- **Base line** heart rate: minimum of 2 minutes in 10 minute segment (110-160)
- Tachycardia: >160, more than 10 minutes
- Bradycardia :

Variability

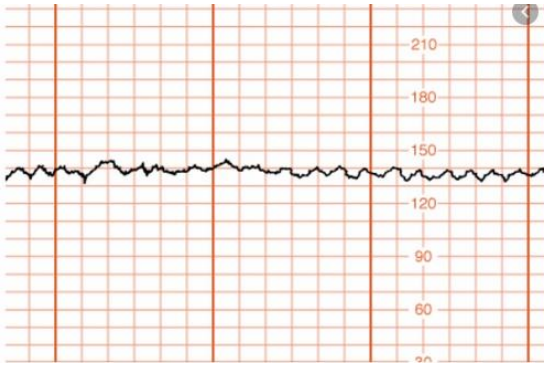
- Average bandwidth in 1-minute.
- **Normal**: 5-25
- **Reduced**: <5 more than 50’,Or >3’ during deceleration
- **Absent:** undetectable
- **Increased variability(saltatory):** >25 more than 30’,

variability

saltatory

- May be with recurent decelerations
- Due to fetal autonomic instability
- >30’ may indicate hypoxia even without decelerartions

Sinusoidal pattern



Regular

Amplitude of 5-15b/m

Frequency of 3-5 c/m

>30’

Absent accelerations

Pathophysiology: sever fetal anemia ,hypoxia,infection,cardiac malformations

Pseudo-Sinusoidal pattern

More jagged appearance

Duration< 30’ (discriminate)

NI patterns before and after

Caused by: analgesic, fetal mouth movement

Accelerations

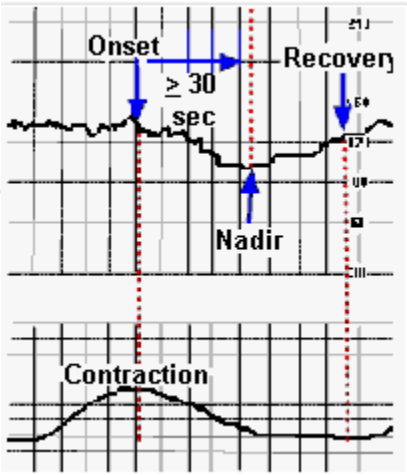
Abrupt(onset to peak <30sec)

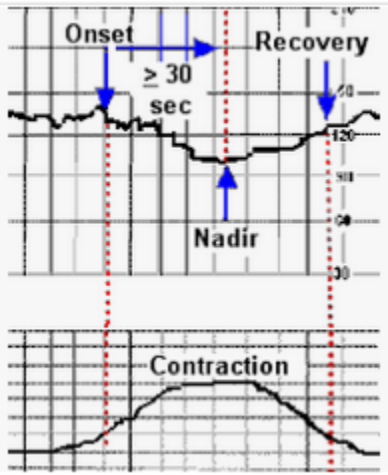
>15b/m

Lasting >15 sec, <10’

Before 32 weeks (10sec, 10b/m)

DecelerationS





>15 sec

Early decelerat

Onset to nadir >30 sec

Normal variability

Late first stage and second stage of labor

Do not indicate hypoxia

Variable decelerations:

Onset to nadir <30 sec

Seldom associated with hypoxia- acidosis (if u shape, 60 criteria with decreased or increased variability)

Late deceleration:

Onset/end to nadir >30 sec

Starts >20 sec after the end of contraction

Fetal hypoxia

In trace without acceleration and reduced variability include 10-15 b/m

Decelerations

Prolonged decelerations:

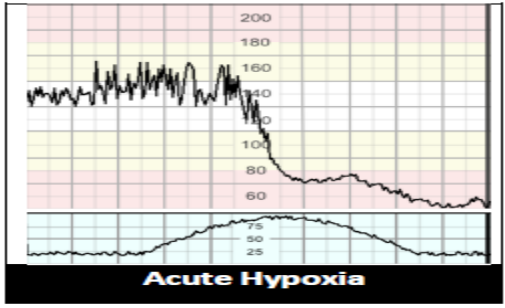
>3 min

Hypoxia

Intrapartum hypoxia generally follows one of 3 pathways:

- **1. Acute Hypoxia**
- **2. Subacute Hypoxia**
- **3. Gradually Evolving Hypoxia**
- **4. Chronic Hypoxia**

Acute hypoxia:



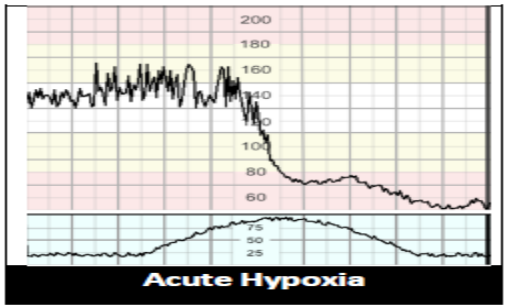
- Presents as: prolonged deceleration>5 min or >3 min with ↓ variability
- **Cause**:3 Accidents
- § Cord prolapse/§ Placental Abruption/§ Uterine Rupture
- 2 Iatrogenic
- § Maternal Hypotension (usually secondary to supine hypotension or epidural § Uterine hyperstimulation (by oxytocin / PGs) or
- spontaneous increased activity

- Fetal PH drops 0.01/ min

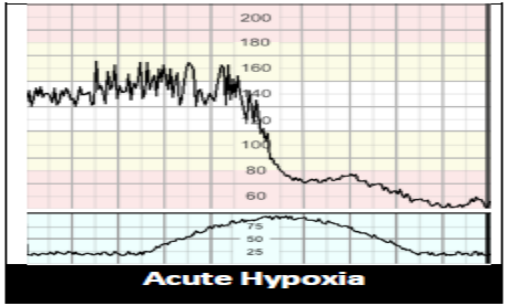
1-Acute hypoxia:

Management : **3- minute rule**

- **0-3:** deceleration > 3 min: summon the on call team
- **3-6**: diagnose the cause, if an accident is diagnosed: immediate delivery as soon as safely
- If an iatrogenic cause is diagnosed: immediate measures to correct (avoiding supine position, stopping uterine stimulants, starting IV fluids, and administering tocolytics.)
- **6 – 9**: Signs of recovery (return of variability and improvement in heart rate) should be noted, If no signs of recovery are noted, preparation for immediate delivery MUST be started.
- **9 – 12**: By this point in time the deceleration has either recovered, or preparation for a delivery fetus by **12 – 15** minutes.



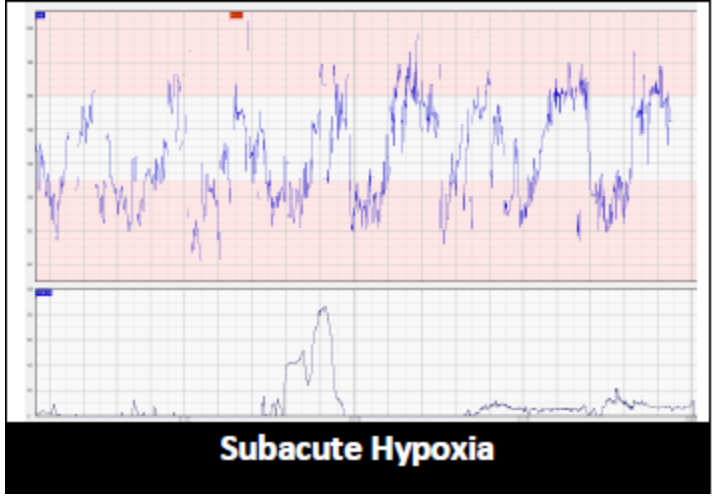
Important Notes:



- ● Do not follow the 3-minute rule if the deceleration is preceded by reduced variability and lack of cycling,
- immediate preparation to delivery by the safest and fastest route

- • If normal variability and cycling before and during the first 3 minutes of the deceleration, it is likely that 90% will recover within 6 minutes, and 95% in 9 minutes, if acute accidents have been excluded

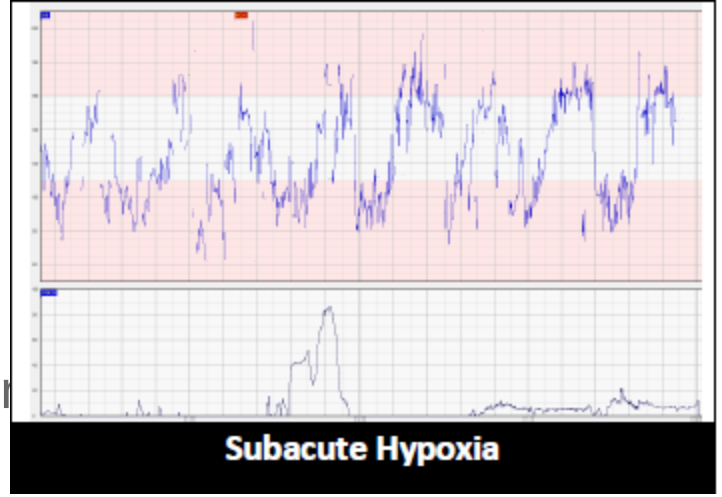
2. Subacute Hypoxia



- **Presents** on the CTG by the fetus spending most of the time in decelerations.
- This is almost invariably **caused** by uterine **hyperstimulation.**

- **Fetal pH drops** at a rate of 0.01 / 2-3 minutes

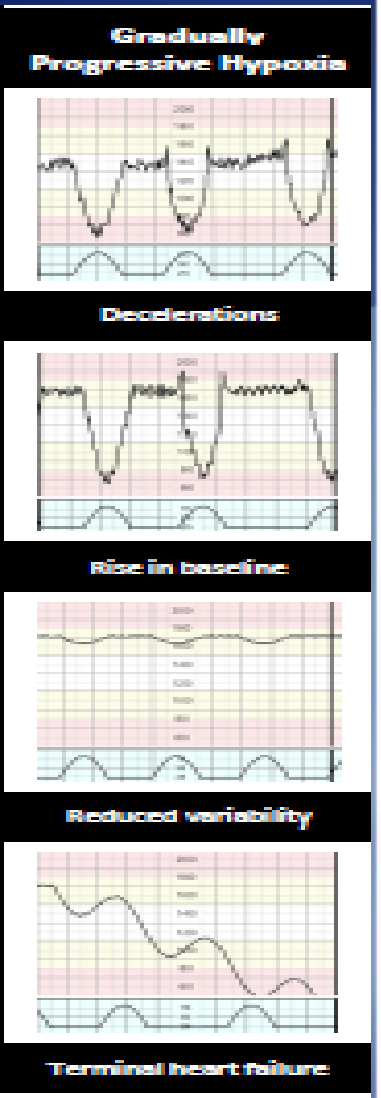
2. Subacute Hypoxia Management:



- 1. Stopping / reducing uteroto
- 2. Avoiding supine position
- 3. Starting IV fluids
- 4. Administering tocolytics if hyperstimulation persists despite previous measures
- 5. Expediting delivery if hypoxia persists despite tocolysis (AVD / CS)

- If encountered in the second stage of labour:
- 1-ask mother to stop pushing to recovery of the fetus
- 2-If no improvement in 10 minutes, expedite delivery.
- 3-Once stable recommence pushing.
- 4-If subacute hypoxia recurs, expedite delivery.

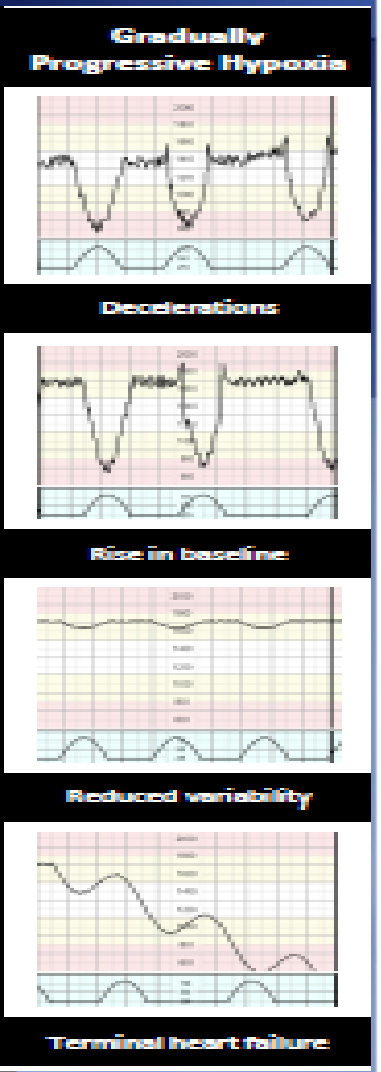
3. Gradually Evolving Hypoxia



- • This is the most common type of hypoxia in labour
- • During this process, the fetus has the same changes that a normal
- adult would show during exercise
- • This tends to **present** with the following order:
- 1. Evidence of hypoxic stress (decelerations)
- 2. Loss of accelerations and lack of cycling
- 3. Exaggerated response to hypoxic stress (decelerations become
- wider and deeper)
- 4. Attempted redistribution to perfuse vital organs facilitated by
- catecholamines (first sign noted is a rise in baseline)
- 5. Further redistribution with vasoconstriction affecting the brain
- (reduced baseline variability)
- 6. Terminal heart failure (unstable/ progressive decline in the
- baseline - “step ladder pattern to death”)

3. Gradually Evolving Hypoxia

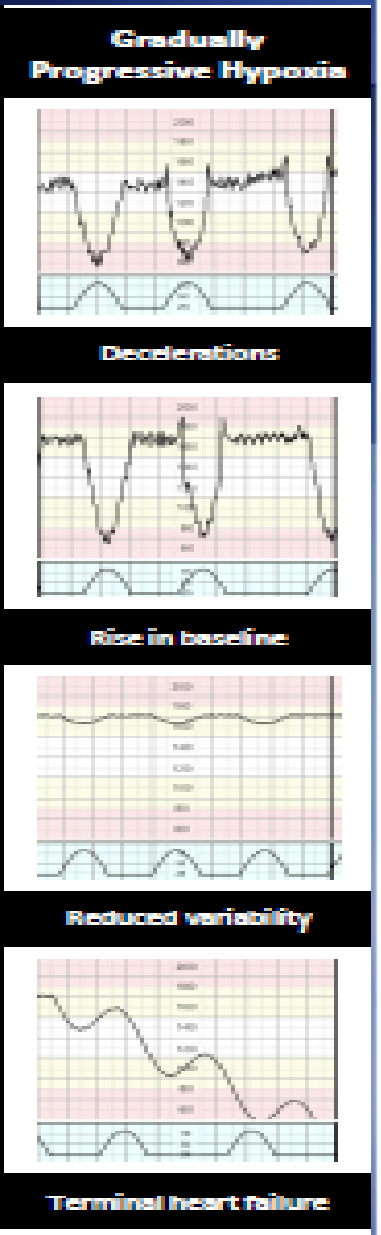
Important Notes:



- • Stages 1– 4 : evidence of stress with fetal **compensation**.
- • Stages 5 – 6 : evidence of stress with fetal **decompensation**.(reduced variability, “step ladder pattern to death)
- • Stages 4 & 5 :may be reversible although prolonged episodes of hypoxia can lead to fetal organ damage.

3. Gradually Evolving Hypoxia

Management

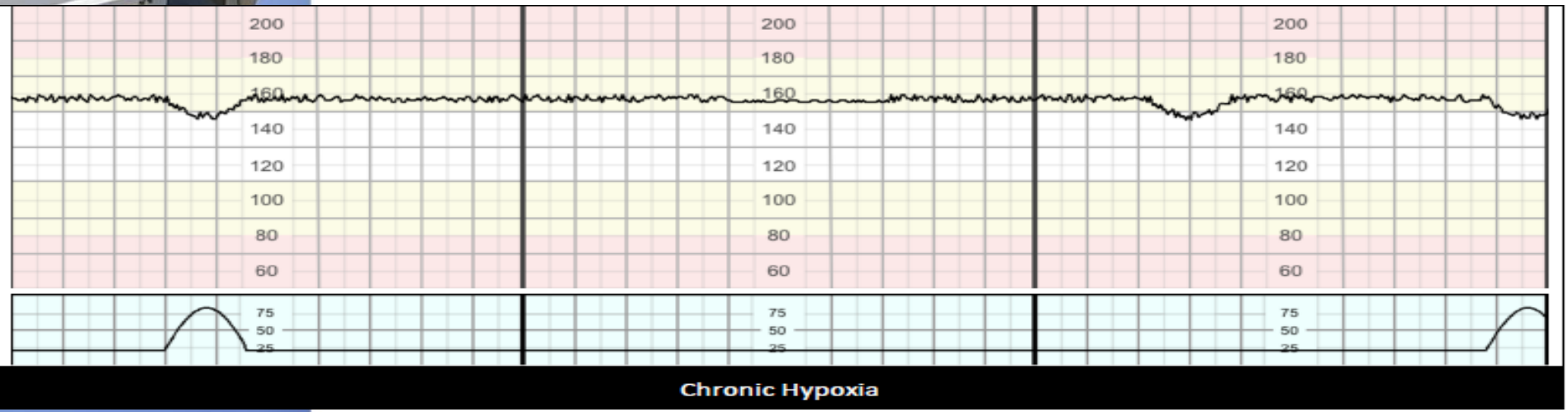


- **Management** of gradually progressive hypoxia is by improving fetal
- conditions with the first signs of redistribution to avoid internal organ
- damage. (stage 4).

4. Chronic Hypoxia

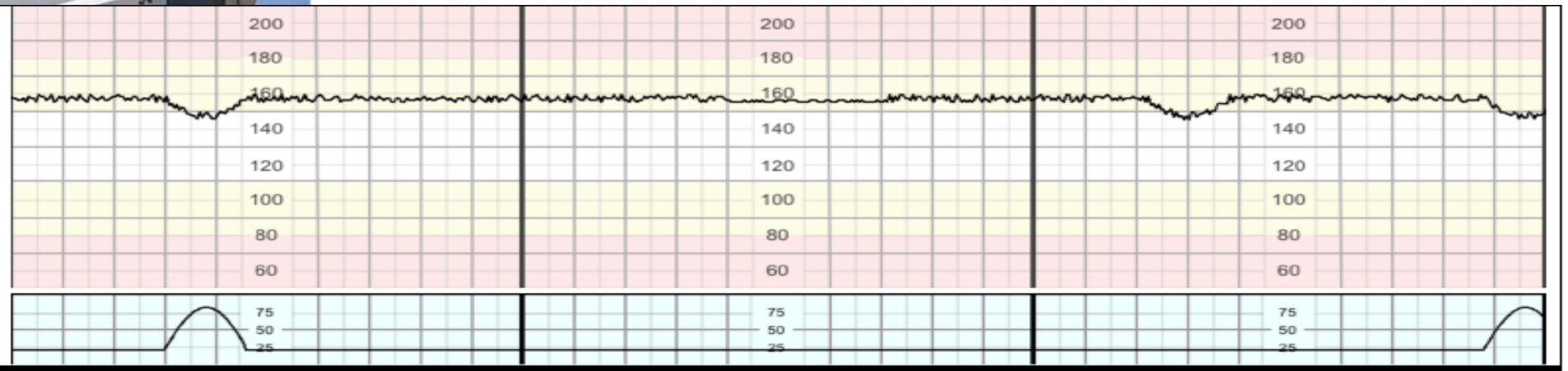
- antenatal type of hypoxia with implications for intrapartum care
- • **Presents** as a baseline at the upper end of normal associated with ↓variability &
- blunted responses (infrequent accelerations and lack of cycling) and is frequently associated with
- shallow decelerations.
- • This represents a fetus with reduced reserve and increased susceptibility to hypoxic injury during labour.
- • potentially Increasing the risk of

  hypoxia, with low threshold for surgical intervention.



4. Chronic Hypoxia

Table 3 - Checklist to exclude chronic hypoxia and pre-existing fetal injury Pereira and Chandraharan 2017			
1	Baseline fetal heart rate appropriate G.A.	Yes	No
2	Normal variability and cycling	Yes	No
3	Presence of accelerations (not in labour or latent phase of labour)	Yes	No
4	No shallow/ late decelerations	Yes	No
5	Consider the wider clinical picture: meconium, temperature, fetal growth, reduced fetal movements	Yes	No
Overall Impression: Normal / Chronic Hypoxia / Other:			
Management Plan:			



Chronic Hypoxia

Intermittent auscultation(IA)

- Obstetric review and plan of care
- CEFM in low risk: increased intervention
- Method: no good evidence of frequency and duration
- Every 15’ in first and 5’ in second stage

- Inclusion criteria:
- 1-FM in preceding 24 hours
- 2-At first 1’ duration
- 3-In early labor an acceleration should be noted
- 4-Maternal pulse should palpated simultaneously
- 5-Immediately after contraction and 1’
- 6-Count FHR, don’t rely on screen
- 7-variability can not be detected

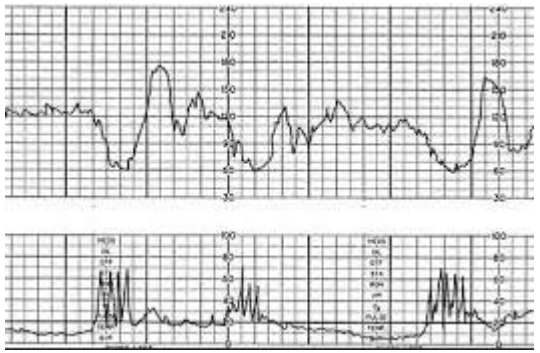
CTG interpretation

- Assess the trace:
- **Step 1:** The clinical setting
- o Current gestational age
- o Antenatal events (e.g. IUGR, PET, medications)
- o Previous CTG traces o Identified risks
- o Contractions (is the inter-contraction interval more than 90 seconds?)
- o **Baseline Heart rate:**
- § It is the most important on a CTG trace. Compare baseline rates on previous CTGs.
- § A change in baseline (by >10%) signifies a need for further attention. (In chronic hypoxia, more subtle changes to the baseline should also be considered significant).
- **Variability and Cycling:**

CTG interpretation

- **<u>Accelerations:</u>**

- **An acceleration starts from, and returns to the baseline.**
- It is important to differentiate accelerations from overshoots (increase in FHR by accumulation of CO2 during hypoxic episodes) and shouldering following decelerations with cord compressions.
- **Accelerations with contractions, especially in the second stage : exclude maternal HR**



CTG interpretation: Decelerations:

- • Repeated chemoreceptor decelerations (late, prolonged, or reduced variability within deceleration) signify the placental stores are being
- depleted. can be corrected by changing maternal position, or increasing circulating volume by hydration, reducing the stress by reducing/stopping oxytocin. If this does not correct the situation it is important

- • Prolonged decelerations (>5 minutes or >3 minutes with reduced variability) : 3-minute rule

- • An isolated deceleration in non-labouring women is acceptable, however, repeated unprovoked decelerations in non-labouring women are a need for further investigation and assessment.

CTG interpretation

- **Be aware that if the CTG parameters of baseline FHR and variability are normal, the risk of fetal acidosis is low**

Actions in suspected fetal hypoxia

- **Excessive uterine activity:** (terbutaline) or nitro-glycerine
- **Aorto-caval compression :**Turning mother to lateral
- **Transient cord compression** (variable decelerations) changing maternal position
- **ACTION WITH NO SUPPORTING EVIDENCE:**
- Oxygen in a well oxygenated mother, this does not alleviate fetal hypoxia

  I.V. fluids in normotensive, well hydrated women