

Introduction to Fetal Monitoring 2021

Understanding the Placenta

Most important accessory fetal structure

Origin: 4/5 of fetal origin (trophoblasts), 1/5 of maternal origin (uterus)

Has a limited life span:

- Clearly defined by 3rd month of pregnancy (12 weeks)
- Continues to grow until 7th month
- Begins to shrink after 8 months

At term: 20cm diameter, 3cm thick, 400-600Gm in weight

Function of Placenta:

Endocrine gland - Produces HCG, HPL, EST, PRO

Exchange nutrients & waste products - functions as lung, GI, kidney

Appearance:

Fetal side smooth

Maternal side lobular, vascular (cotyledons)

Placental - Fetal Circulation = Closed vascular system

Transfer of substances through chorionic villi

Exchange through differences in concentrations & pressure (diffusion)

Closed vascular system – Fetal & Maternal blood do not mix

Response to Labor – Effects of Uterine Contractions

Contractions = Compression

Contractions stress the fetus and challenge oxygenation (fetus needs placenta for oxygenation)

Fetus needs adequate _____ to tolerate compressive forces

Fetal Heart Monitoring – Evaluating Uterine Contractions & Fetal Response

How to read the monitoring paper

How to measure uterine contractions:

Frequency:

Duration:

Intensity:

Nose:

Chin:

Forehead:

Contraction patterns:

Normal – contractions q. 2-3 minutes, average duration 60 seconds

Tachysystole - more than 5 contractions in 10 mins averaged over 30 min period

Electronic Assessment: EFM

FHR sound – crisp, clear, fast

Critical Note: May pick up a soufflé versus the crisp FHR sound.

Funic soufflé = synchronous with the fetal heart

Uterine soufflé = synchronous with maternal heart rate

Methods of Evaluating FHR (Independent Learning Activity):

Doppler

External Fetal Monitor - Measures rate and pattern of fetal heart rate

Internal Monitoring – Intrauterine Pressure Catheter (IUPC) or Scalp Electrode (FSE)

Components of Fetal Heart Rate Patterns**Baseline**

Average FHR observed

Round to increments of 5 bpm, excluding accelerations, decelerations, variability

Variability

Interplay between the sympathetic and parasympathetic nervous systems

Presence of moderate variability = fetus healthy, no signs of fetal acidemia

Absent

Minimal

Moderate

Marked

Sinusoidal pattern – regular smooth, undulating wave pattern

Baseline Changes**Tachycardia**

Often with absent or minimal variability

Risk fetal demise

Maternal Causes: fever, dehydration, anxiety, and some meds

Fetal Causes: early fetal hypoxia, asphyxia, anemia, infection, premature

Bradycardia

Maternal Causes: hypotension, some meds

Fetal Causes: stimulation of vagal nerve, hypoxemia, and fetal asphyxia

Periodic Changes

Accelerations

Abrupt, temporary increases of at least 15 bpm x 15 seconds, indicates fetal well-being

Decelerations

Blood flows through placenta and delivers O₂ where fetus picks it up

Definition of “nadir” = lowest point of the deceleration

Early – gradual decrease below baseline that is always occurs with a contraction

Mirrors the contraction

Normal physiological event as baby head descends

Cause:

Results in decreased cerebral blood flow

Stimulates chemoreceptors > stimulates vagal nerve >-slows FHR-

Nursing Management – None, continue to monitor

Variable – abrupt decrease in FHR baseline

Common

Onset, shape, and occurrence varies

Cause:

Normal Variable Deceleration only result in temporary FHR decrease

Non-reassuring Variable Deceleration

More indicative of fetal hypoxia

Decrease in variability

Shoulder

Overshoot

Slow to recover

Nursing Management: Position change, Amnioinfusion, POPI prn

Late Deceleration – gradual decrease in FHR baseline

Occur after the contraction is underway, may be subtle at first

Cause :

Nursing Management: Treatment of fetal distress

Prolonged Deceleration-decrease in FHR baseline lasting between 2 -10 minutes

Nursing Management: Treatment of fetal distress

NICHD Three-Tier FHR Interpretation System

NICHD = National Institute of Child and Health Development

Category I - Normal

Baseline 110-160
Moderate variability
Absent late or variable decelerations
Accelerations present or absent
Early decelerations present or absent

Category II - Indeterminate (Grey Area)

All FHR tracings not in Category I or III
Bradycardia without absent variability
Tachycardia
Minimal variability
Marked baseline variability
No acceleration after fetal scalp stimulation
Recurrent variable or late decelerations w/ minimal or moderate variability
Prolonged deceleration
Variable decelerations w/ overshoots, shoulders, or slow return to baseline

Category III - Abnormal

Fetus will have abnormal acid-base balance
Absent variability with:
 Recurrent late decelerations
 Recurrent variable decelerations
 Bradycardia
Sinusoidal pattern

Fetal Distress

Chronic Cause - repeated insults, fetus is vulnerable, may lack reserves

Acute Cause - drastic insult, high risk of acidosis

S&S of fetal distress

1. Change in baseline rate
2. Decreased variability
3. Periodic changes

Treatment of Fetal Distress**Nursing Management: Intrauterine Resuscitation****“POPI”**

- (a)
- (b)
- (c)
- (d)

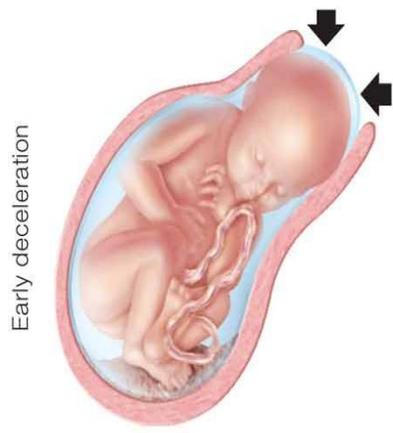
Other treatments:

Fetal Distress continues – Deliver!!!

Now put it all together!

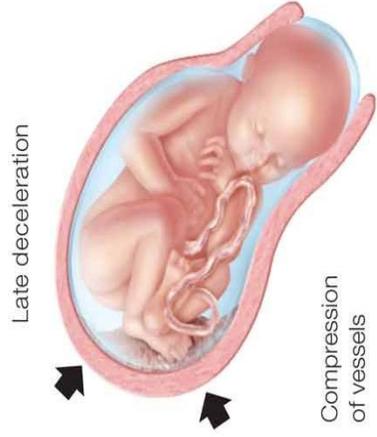
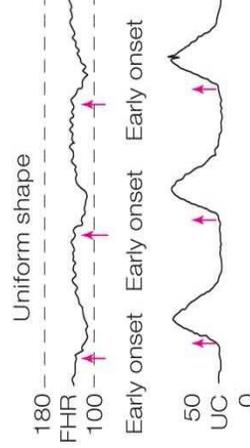
VEAL CHOP MNEUMONIC

V	E	A	L
C	H	O	P



Early deceleration

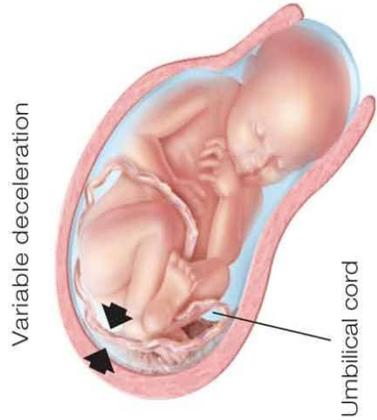
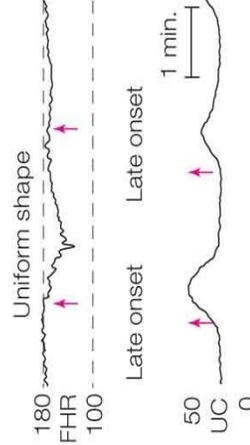
Head compression (HC)



Late deceleration

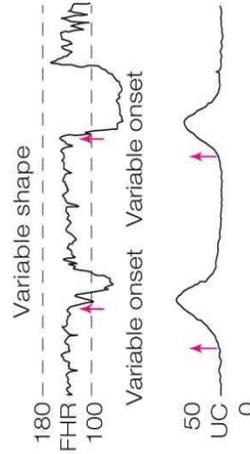
Compression of vessels

Uteroplacental insufficiency (UPI)



Variable deceleration

Umbilical cord compression (CC)



FHR pattern

Shape
Waveform consistently uniform; inversely mirrors contraction

Onset
Just prior to or early in contraction

Lowest level
Consistently at or before midpoint of contraction

Range
Usually within normal range of 120–160 beats/min

Ensemble
Can be single or repetitive

Waveform uniform; shape reflects contraction

Late in contraction

Consistently after the midpoint of the contraction

Usually within normal range of 120–130 beats/min

Occasional, consistent, gradual increase—repetitive

Waveform variable; generally sharp drops and returns

Abrupt with fetal insult; not related to contraction

Variable around midpoint

Not usually within normal range

Variable—single or repetitive