Introduction to Fetal Monitoring 2024

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 – <u>gradual</u> 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)

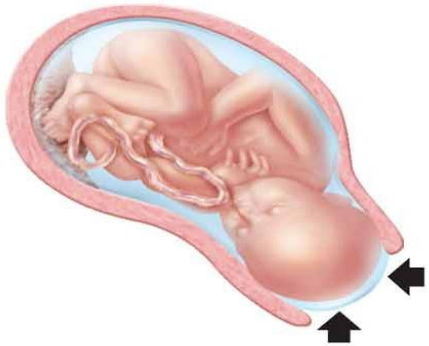
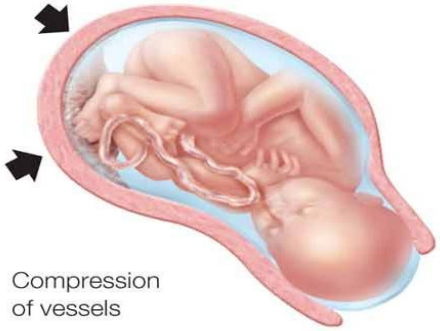
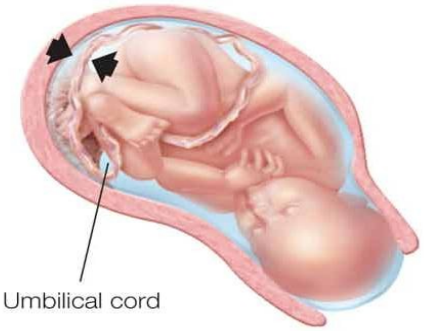
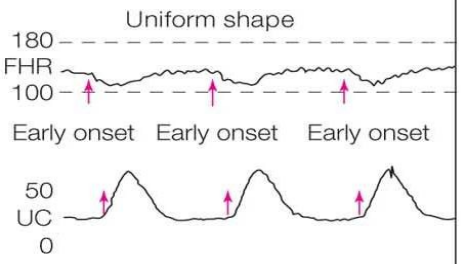
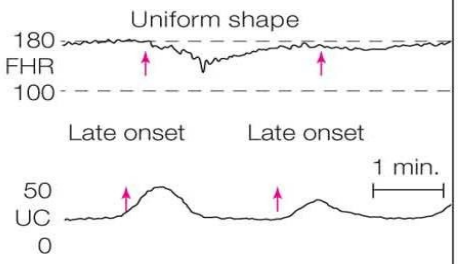
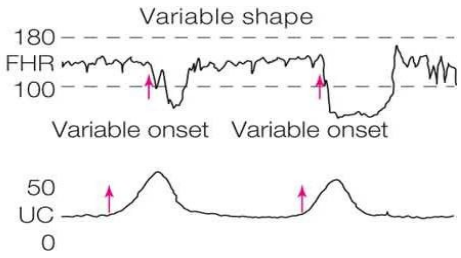
Other treatments:

Fetal Distress continues – Deliver!!!

Now put it all together!

VEAL CHOP MNEUMONIC

V	E	A	L
C	**H**	**O**	**P**

	Early deceleration	Late deceleration	Variable deceleration
			
	Head compression (HC)	Uteroplacental insufficiency (UPI)	Umbilical cord compression (CC)
FHR pattern			
Shape	Waveform consistently uniform; inversely mirrors contraction	Waveform uniform; shape reflects contraction	Waveform variable; generally sharp drops and returns
Onset	Just prior to or early in contraction	Late in contraction	Abrupt with fetal insult; not related to contraction
Lowest level	Consistently at or before midpoint of contraction	Consistently after the midpoint of the contraction	Variable around midpoint
Range	Usually within normal range of 120–160 beats/min	Usually within normal range of 120–130 beats/min	Not usually within normal range
Ensemble	Can be single or repetitive	Occasional, consistent, gradual increase—repetitive	Variable—single or repetitive