

Introduction to Fetal Monitoring 2025

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 indicate 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 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)

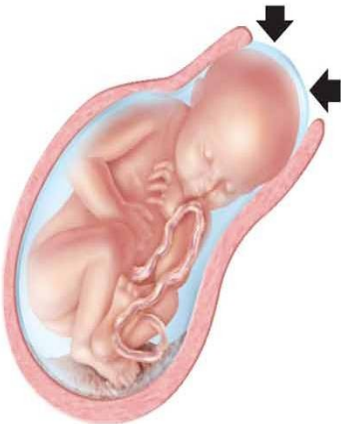
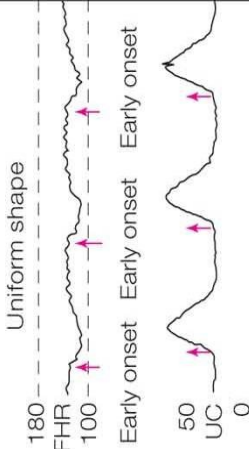
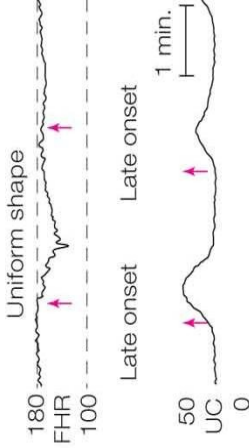
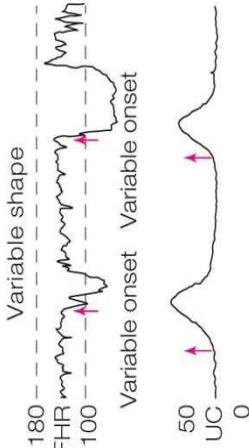
Other treatments:

Fetal Distress continues – Deliver!!!

Now put it all together!

VEAL CHOP MNEUMONIC

V	E	A	L
C	H	O	P

FHR pattern	Early deceleration	Late deceleration	Variable deceleration
			
	Head compression (HC)	Uteroplacental insufficiency (UPI)	Umbilical cord compression (CC)
	 Uniform shape Early onset Early onset Early onset 180 FHR 100 50 UC 0	 Uniform shape Late onset Late onset Late onset 180 FHR 100 50 UC 0 1 min.	 Variable shape Variable onset Variable onset Variable onset 180 FHR 100 50 UC 0
	Waveform consistently uniform; inversely mirrors contraction	Waveform uniform; shape reflects contraction	Waveform variable; generally sharp drops and returns
	Just prior to or early in contraction	Late in contraction	Abrupt with fetal insult; not related to contraction
	Consistently at or before midpoint of contraction	Consistently after the midpoint of the contraction	Variable around midpoint
	Usually within normal range of 120–160 beats/min	Usually within normal range of 120–130 beats/min	Not usually within normal range
	Can be single or repetitive	Occasional, consistent, gradual increase—repetitive	Variable—single or repetitive