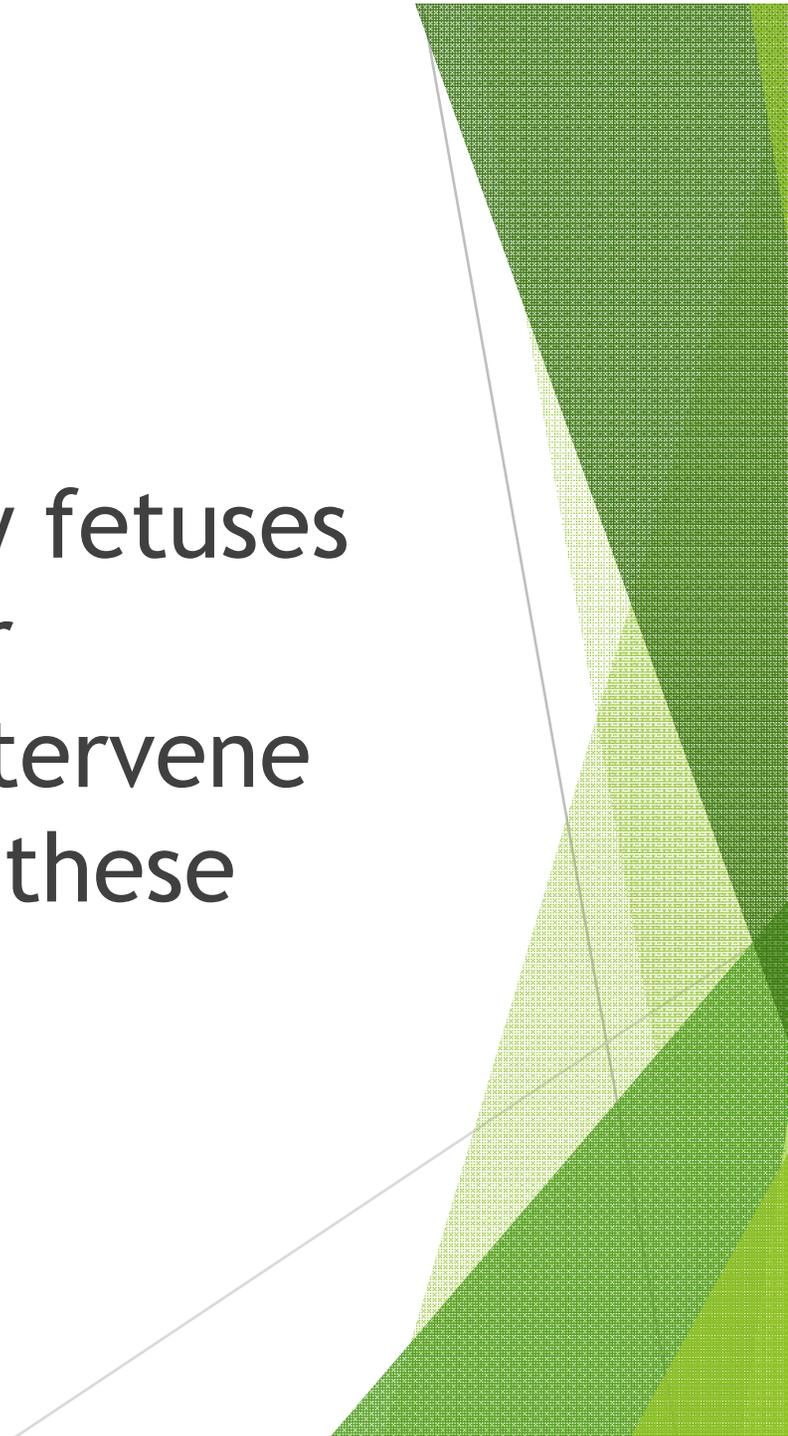


Antepartum Fetal Surveillance

Dr. M. Mokhtari
Associate Professor of OB GYN

Primary Goal

The primary goal is to identify fetuses at risk of intrauterine death or neonatal complications and intervene (often by delivery) to prevent these adverse outcomes, if possible.



ORMAL FETAL MOVEMENT

Sonographically fetal activity can be noted as early as 7 to 8 weeks of gestation.

Maternal perception of fetal movement begins around 16 to 20 weeks of gestation.

The mother's first perception of fetal movement, termed "quickening," is often described as a gentle flutter .

Fetal movement increases throughout day, with peak activity late at night.



Kick counts

- Perception of least 10 fetal movements (FMs) over up to two hours when the mother is at rest and focused on counting ("count to 10" method) .

Patients are instructed to contact within 12 hours for further evaluation if they perceive a significant and persistent reduction in fetal movement and never to wait longer than two hours if there is **absent**.

DIFFERENTIAL DIAGNOSIS

Transient decreases in fetal activity: fetal sleep states, maternal medications (e.g., sedatives), or maternal smoking



Kick counts

- Perception of least 10 fetal movements (FMs) over up to two hours when the mother is at rest and focused on counting ("count to 10" method) .

Patients are instructed to contact within 12 hours for further evaluation if they perceive a significant and persistent reduction in fetal movement and never to wait longer than two hours if there is **absent**.

DIFFERENTIAL DIAGNOSIS

Transient decreases in fetal activity: fetal sleep states, maternal medications (antidepressants, sedatives), or maternal smoking

poor maternal perception of fetal activity

early gestational age

decreased/increased amniotic fluid volume

maternal position (sitting or standing versus lying)

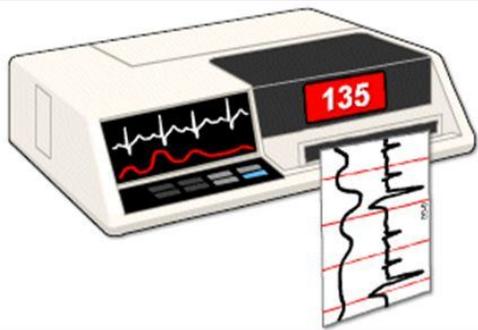
fetal position (anterior position of the fetal spine)

anterior placenta

obesity

maternal physical activity

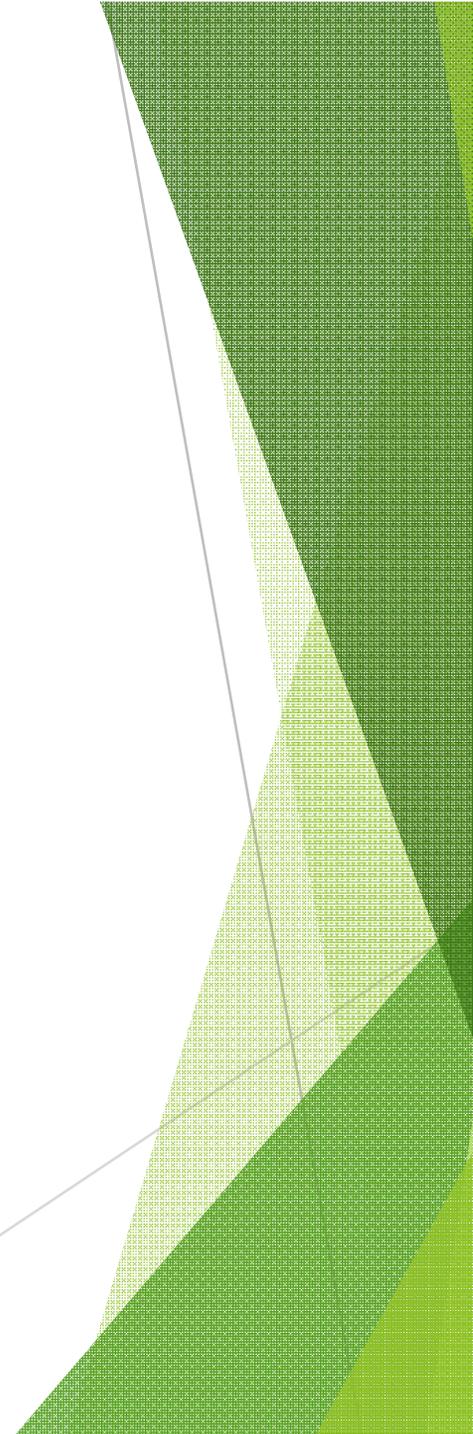
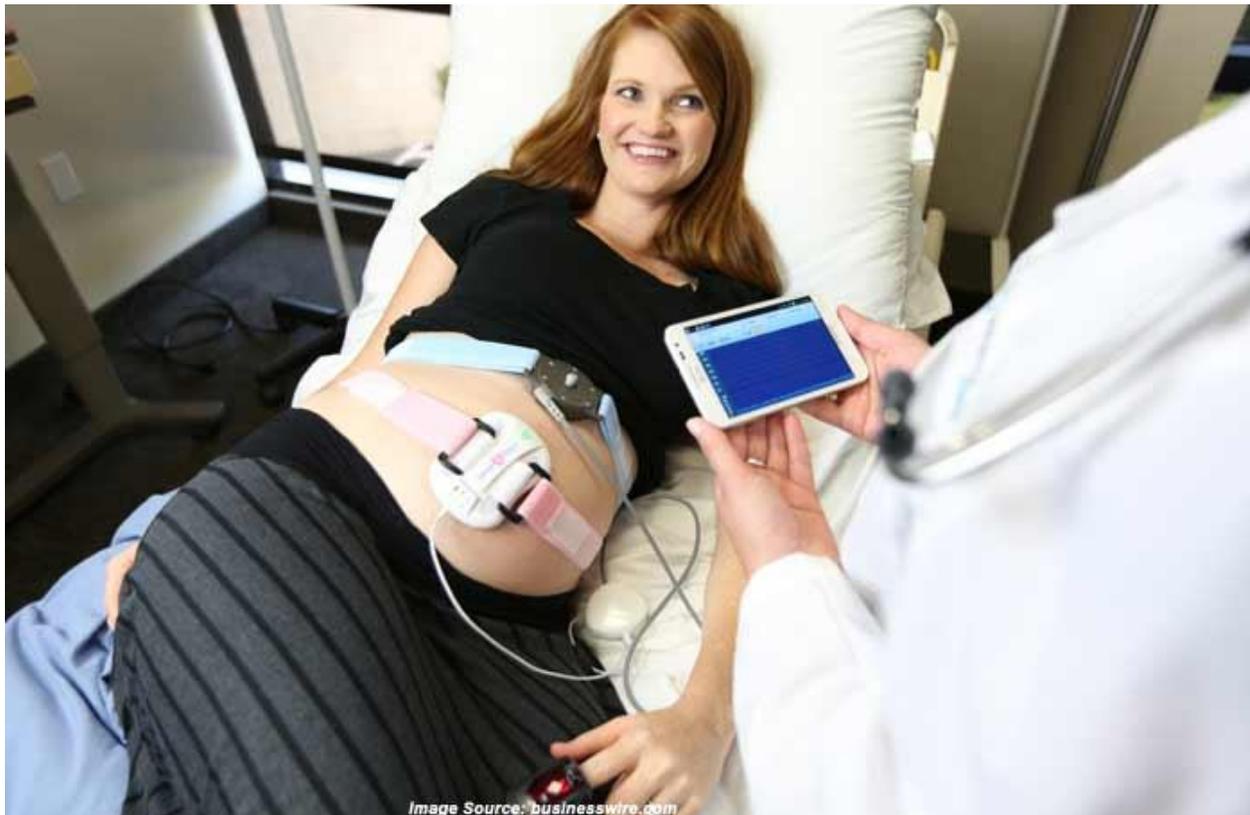


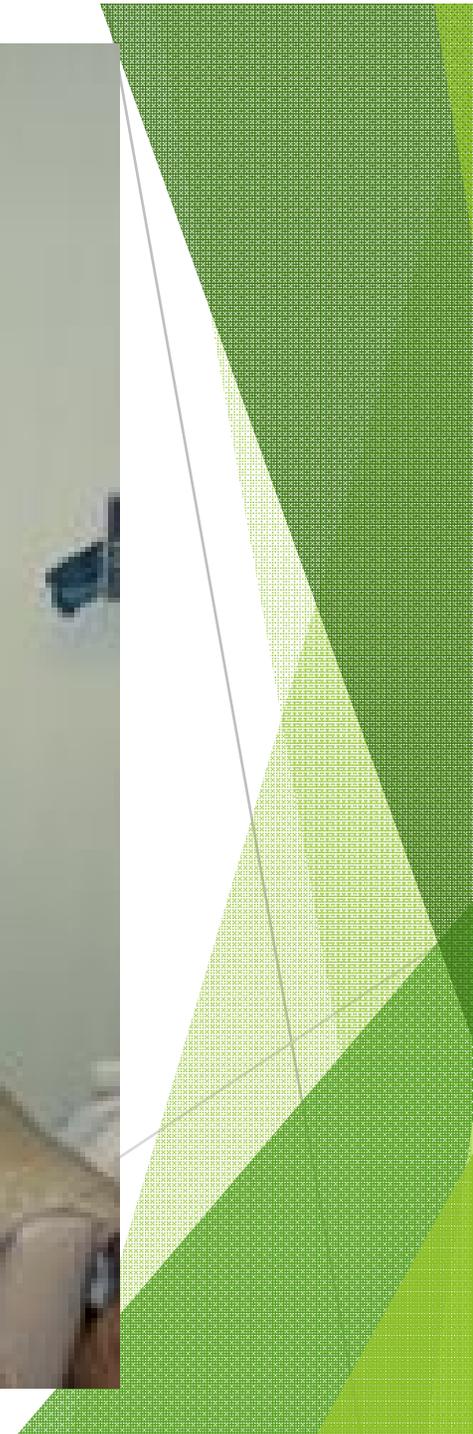


Non stress test



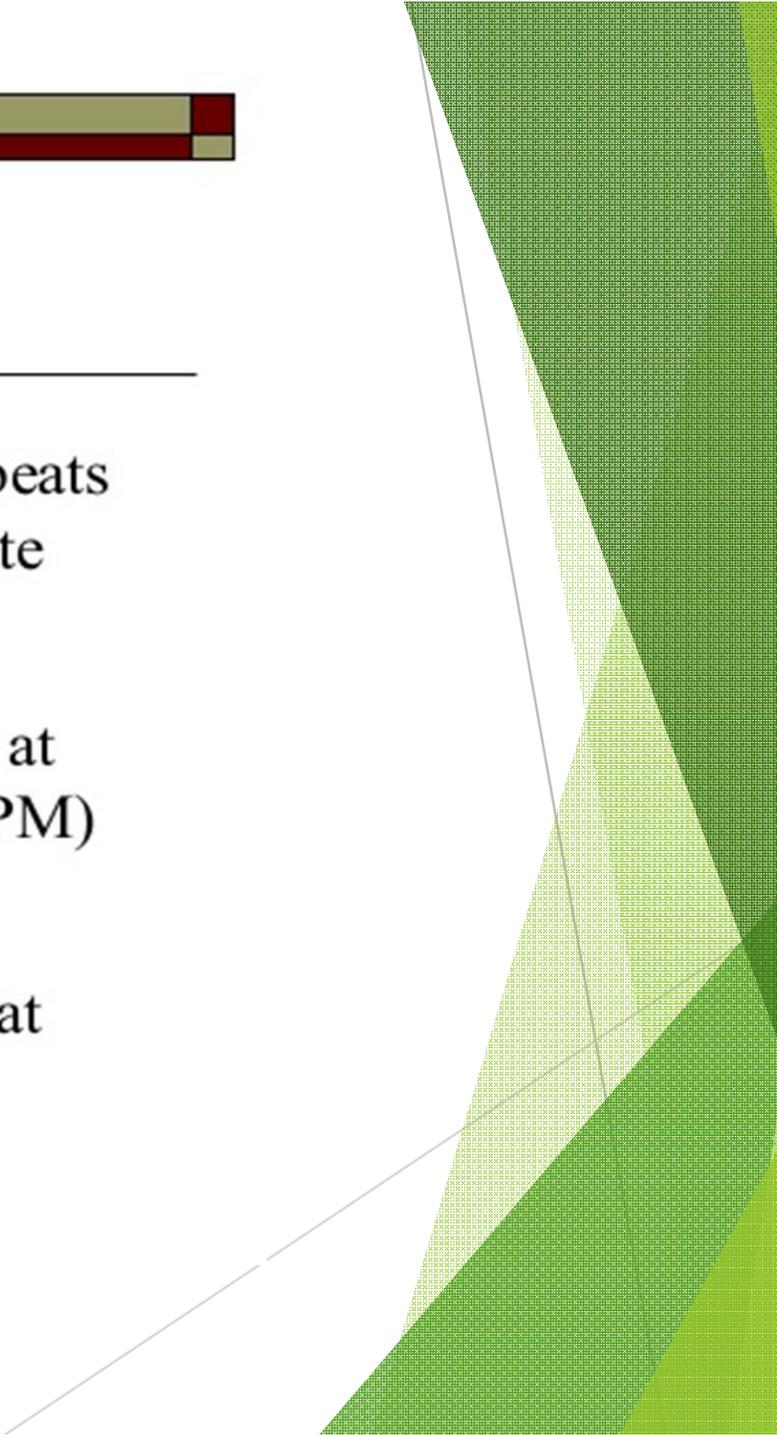






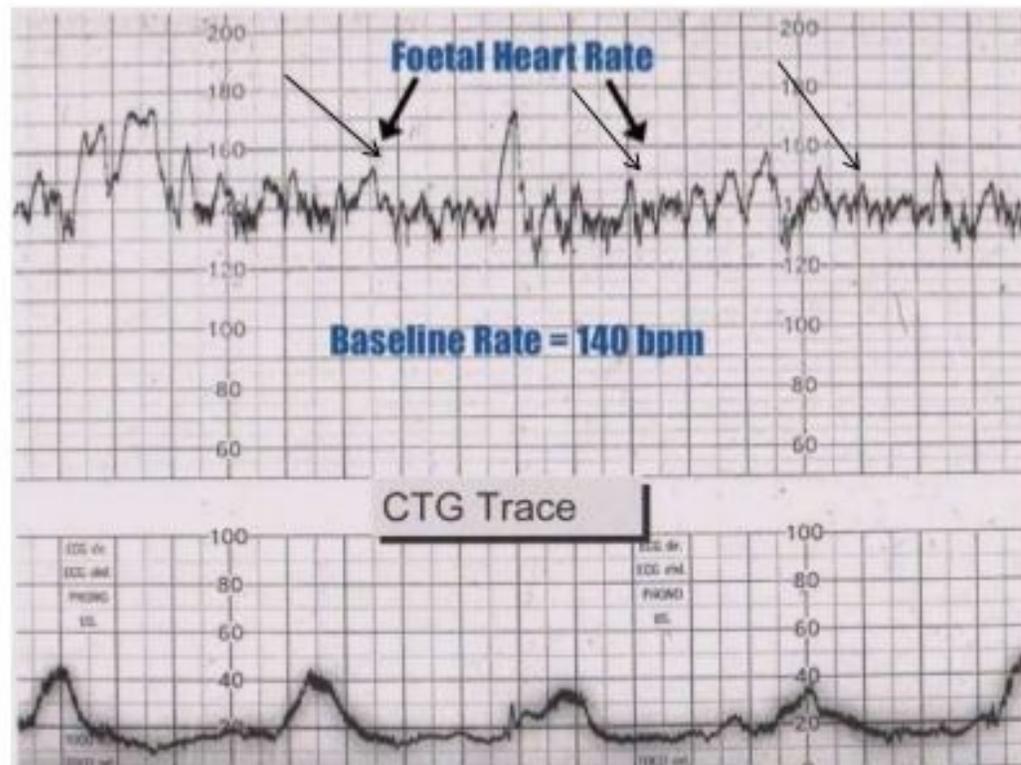


Nonstress Test (NST)

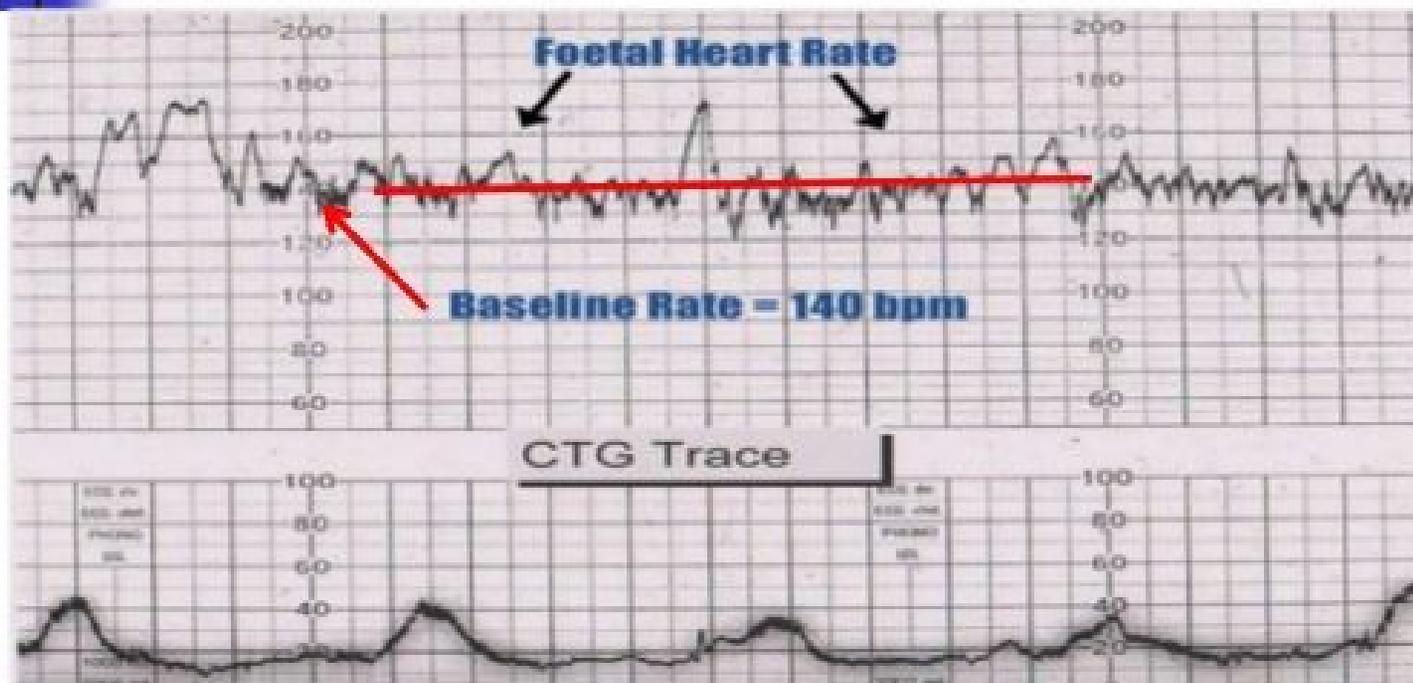
- Target criteria is 2 accelerations of at least 15 beats per minute (BPM) for 15 seconds in a 20-minute period
 - A healthy fetus < 32 weeks' gestation may use at least 2 accelerations of 10 beats per minute (BPM) for 10 seconds in a 20-minute period
 - The more remote from term, the more likely that nonreactivity will be due to fetal prematurity.
- 

BASELINE FETAL HEART RATE

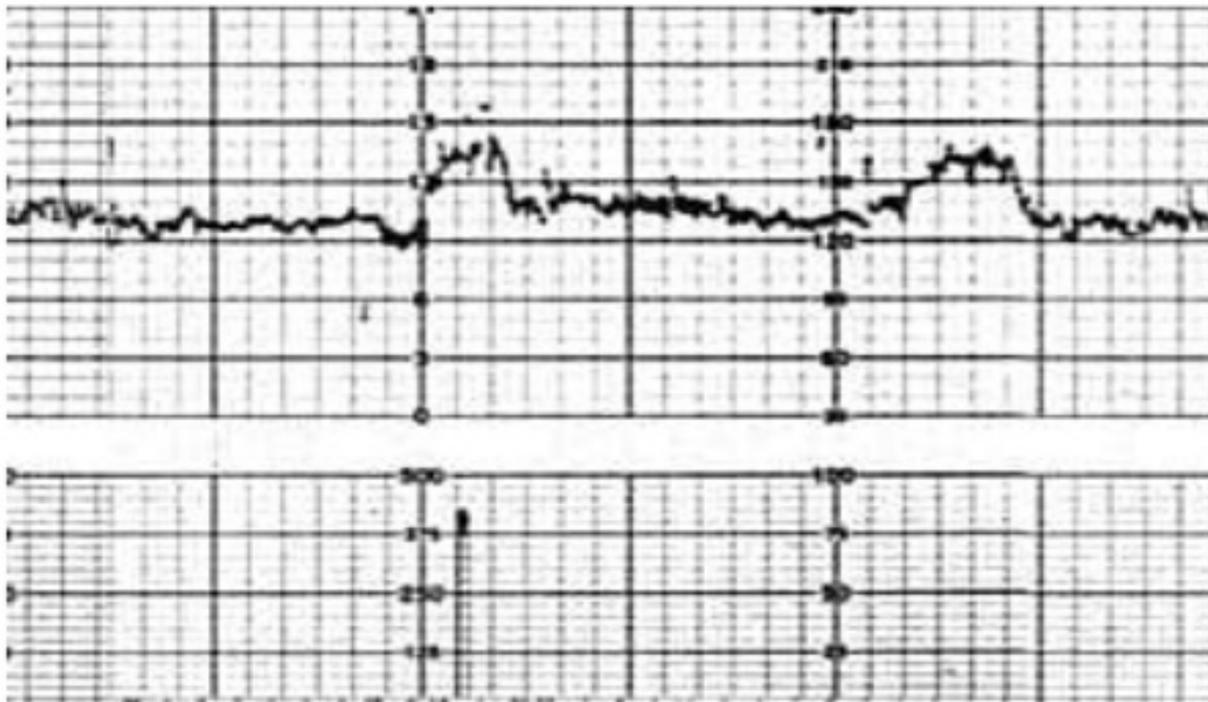
The baseline fetal heart rate should be between 110 and 160 Bpm. It's done by looking at the average line of the fetal heart rate over 10 minutes (10 big squares) ignoring accelerations & decelerations



Baseline Rate of fetal heart



Reactive NST



Non-reactive NST

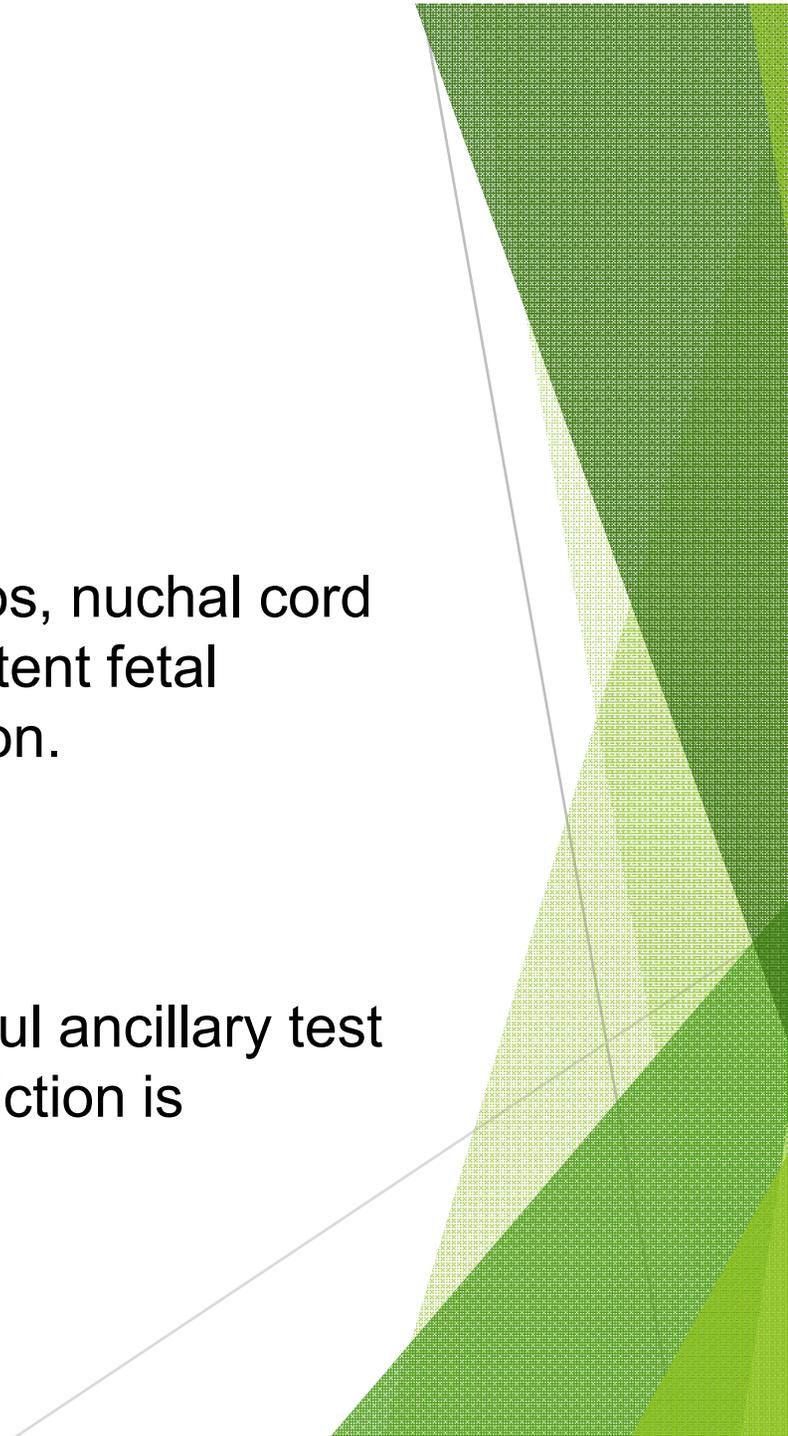


Reactive with decelerations

Sonographic evaluation to look for oligohydramnios, nuchal cord or other compromise of the umbilical cord, intermittent fetal cardiac arrhythmias or intrauterine growth restriction.

BPP

Doppler ultrasound of the umbilical artery is a useful ancillary test of fetal assessment when intrauterine growth restriction is identified



nonreactive tests

The fetal heart rate should be monitored for at least 40 minutes but no more than 120 minutes before interpreting the test as nonreactive.

Metabolic acidemia

Fetal immaturity

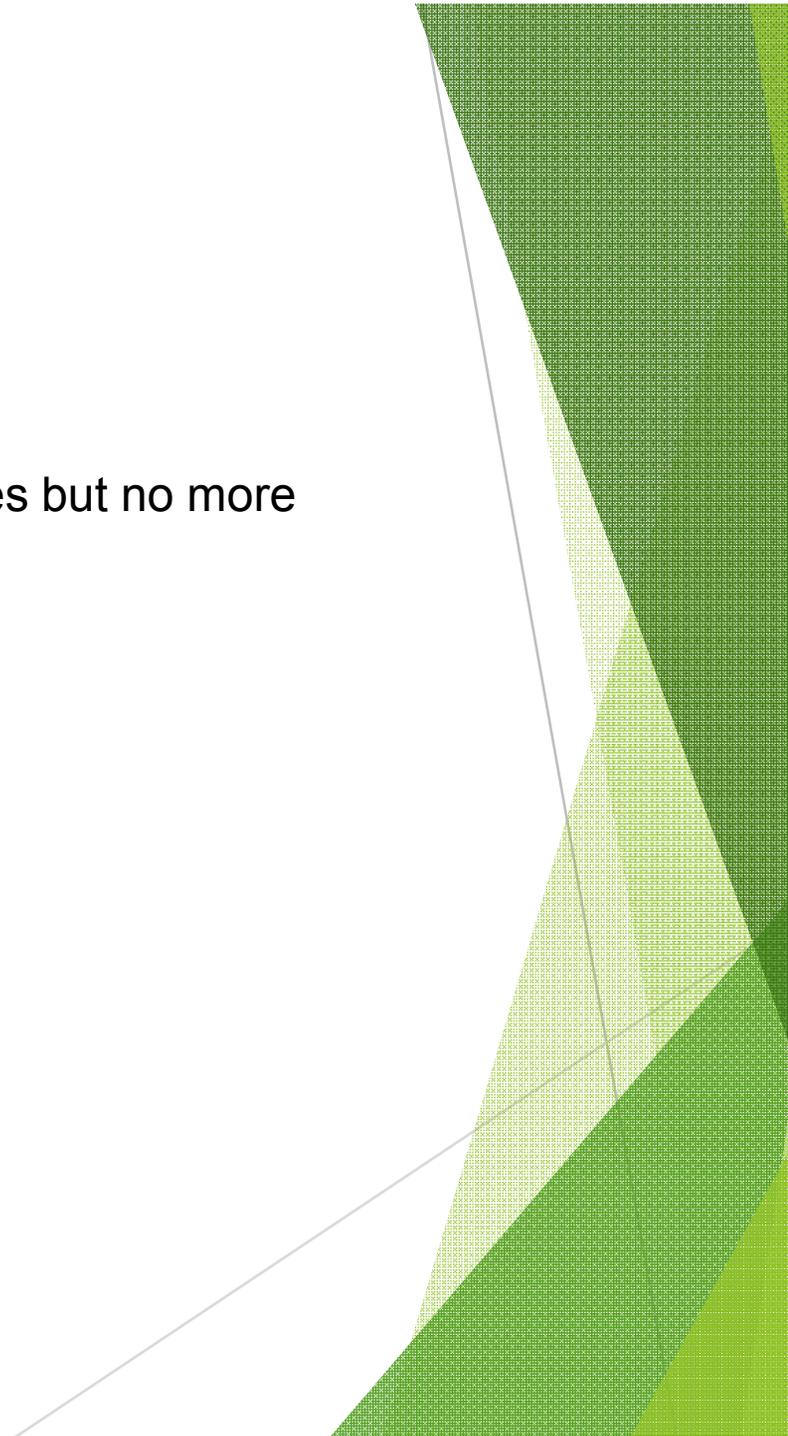
fetal sleep

maternal smoking

fetal neurologic or cardiac anomalies

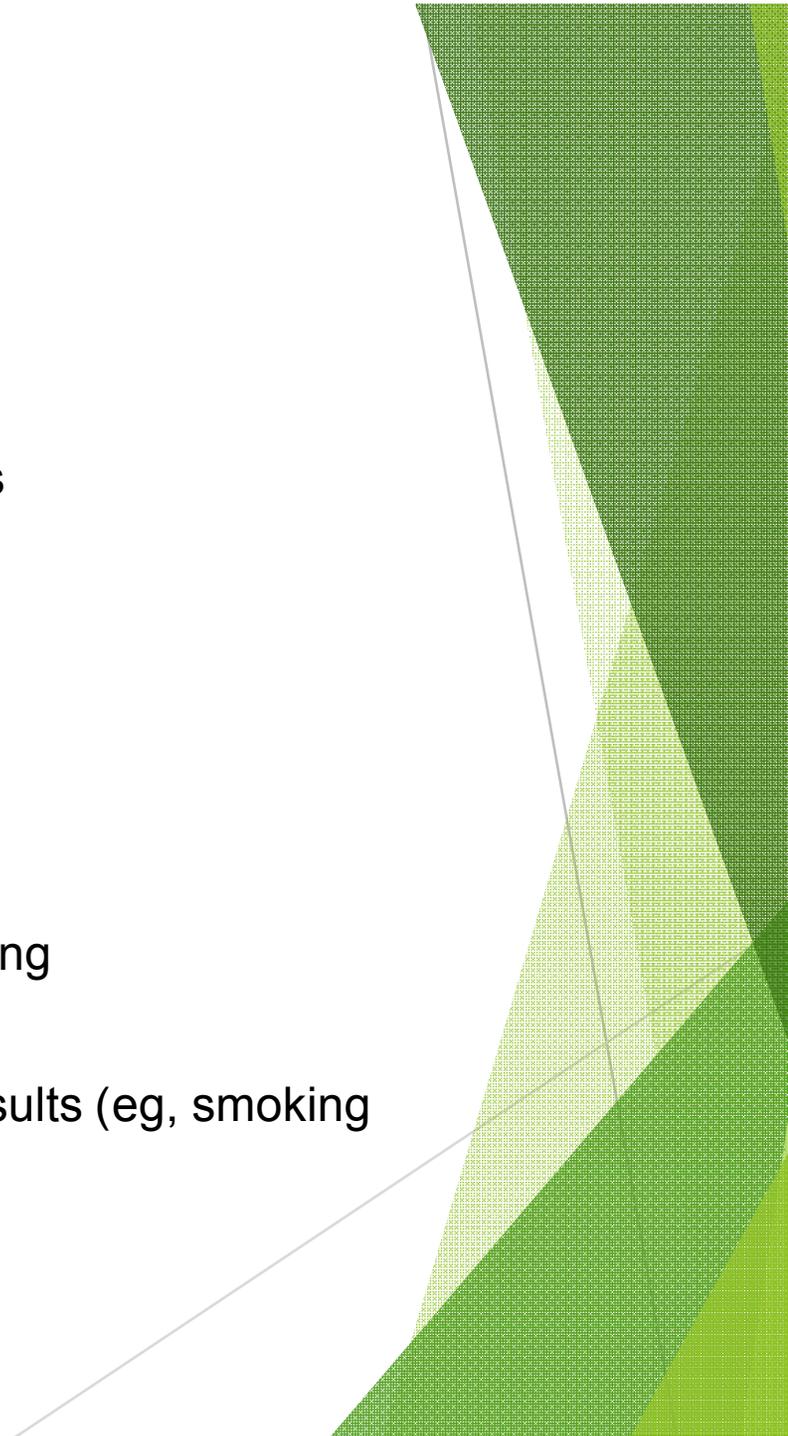
sepsis

maternal ingestion of drugs with cardiac effects



Up to 50 to 60 percent of nonreactive NSTs are false positives

- Repeat the test in 30 minutes
- Perform vibroacoustic stimulation
- Perform a BPP to evaluate other parameters of fetal well-being
- If possible, modify factors potentially causing nonreactive results (eg, smoking proximate to the test)



EVALUATION

Prenatal record

NST

Ultrasound examination – Ultrasound examination is performed within 24 hours to reassess fetal well-being unless the patient reports that the fetus is active and “back to normal” after a reactive nonstress test.

Ultrasound examination should include assessment of fetal activity, breathing, tone, and amniotic fluid volume, as well as fetal growth and anatomic survey if not recently performed.



Doppler velocimetry — Doppler velocimetry is restricted to pregnancies in which fetal growth restriction has been identified on ultrasound examination

- **Return of normal fetal activity and normal evaluation**

- **Persistent DFM and normal fetal evaluation**

pregnancies <37 weeks of gestation, perform nonstress testing and ultrasound examination twice weekly .

Suggest induction after 37 weeks, especially if there are additional risk factors for adverse outcome. There are no randomized trials demonstrating the efficacy and hazards of this approach.



Contraction Stress Test



CST

Either a dilute oxytocin solution is infused or nipple stimulation is performed until three contractions occur within 10 minutes.

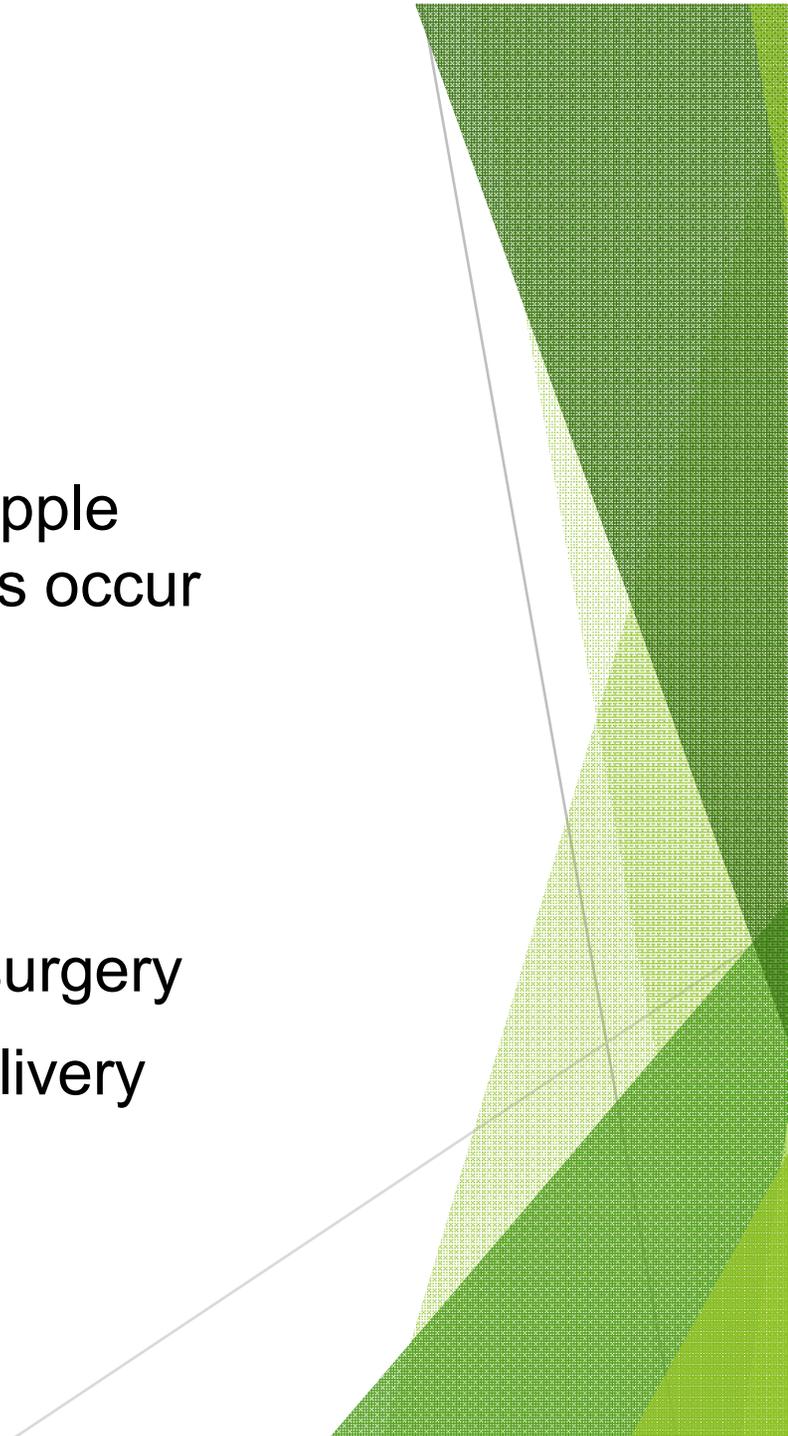
Relative contraindications:

placenta previa vasa previa

classical cesarean delivery or extensive uterine surgery

preterm labor, patients at high risk for preterm delivery

preterm premature rupture of membranes



Positive - A positive (nonreassuring) test has late decelerations following ≥ 50 percent of contractions.

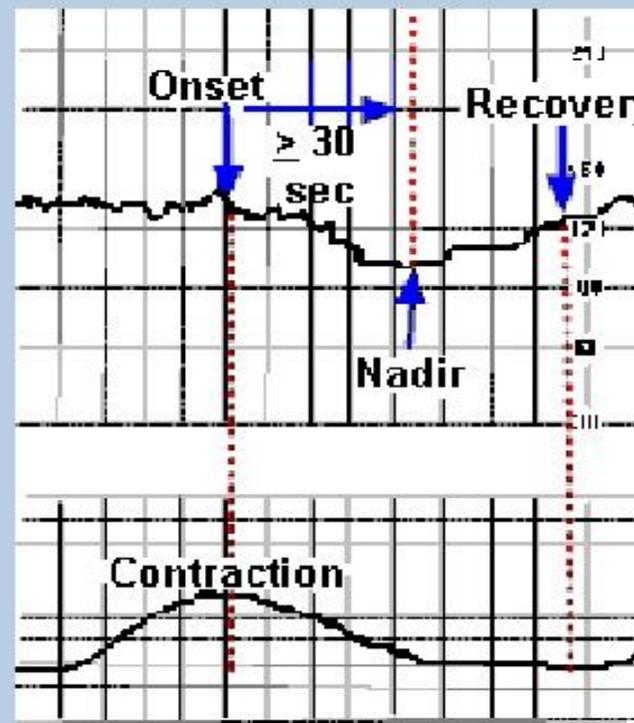
- Negative - A negative (reassuring) test has no late decelerations or significant variable decelerations.

- Unsatisfactory - An unsatisfactory test is uninterpretable or fewer than three contractions in 10 minutes.



LATE DECELERATION

Gradual decrease in FHR with onset of deceleration to nadir ≥ 30 seconds. Onset of the deceleration occurs after the beginning of the contraction, and the nadir of the fetal heart occurs after the peak of the contraction.





- Equivocal - An equivocal-suspicious test has intermittent late decelerations or significant variable decelerations, while an equivocal-tachysystolic has decelerations with contractions occurring more frequently than every two minutes or lasting longer than 90 seconds.

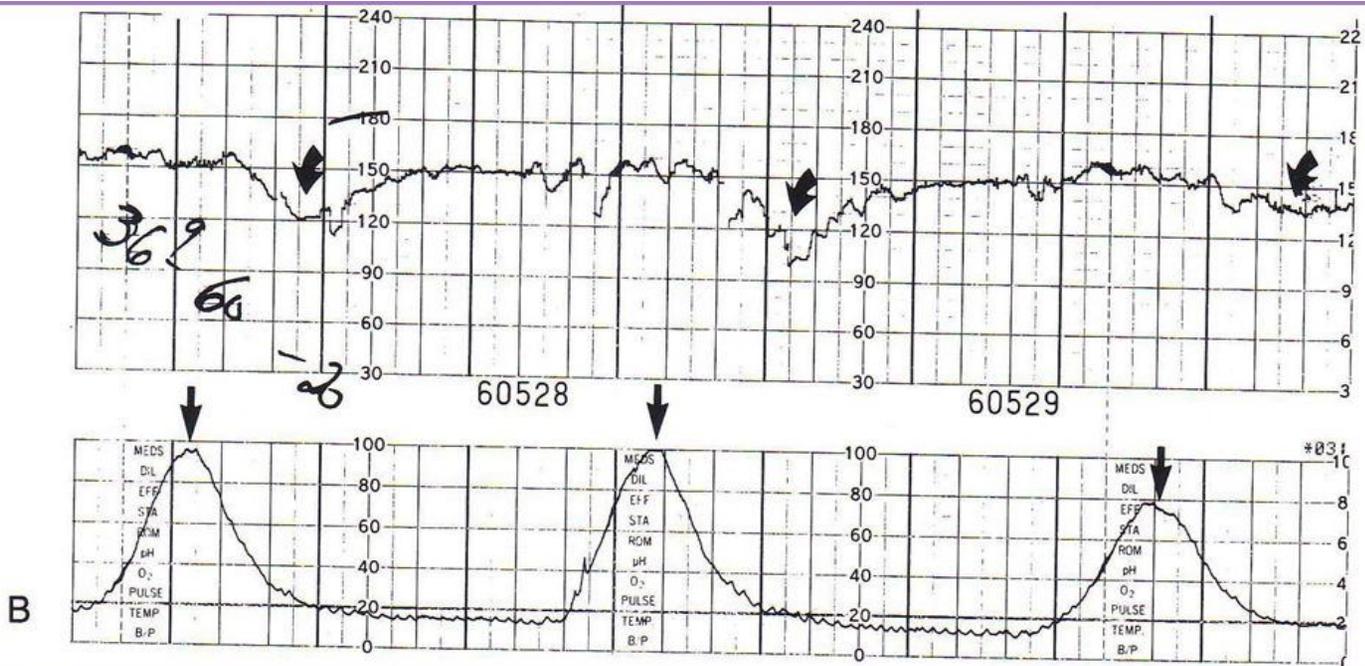
The presence or absence of accelerations is also generally noted. For example, a reactive positive CST is a FHR tracing that meets criteria for both a reactive NST and a positive CST

Positive contraction stress test

May indicate fetal hypoxemia and correlates with a 20 to 40 percent incidence of intrapartum category II or III FHR patterns (true positive).

An equivocal-suspicious test is also associated with intrapartum category II or III FHR patterns, which are often related to cord compression due to oligohydramnios, especially with postterm pregnancy.





B

- Positive contraction stress test
- Fetal heart rate deceleration
- Fetal hypoxia (uteroplacental insufficiency)

Because of the CST's high false-positive rate (>60 percent), FHR reactivity during the test is used to differentiate false-positive tests (an intrapartum FHR not requiring intervention) from true-positive tests (an abnormal intrapartum FHR requiring intervention).

In one study, 50 percent of reactive positive CSTs were false positives, whereas 100 percent of nonreactive positive CSTs were true positives

INTEPARTUM FETAL HEART RATE TESTING

There is no conclusive evidence that use of NSTs and CSTs leads to a reduction in fetal death or neurologic injury.

Nevertheless, performing NSTs or CSTs in pregnancies deemed to be at high risk is a standard obstetric practice .

It is impossible to abandon use of these tests while awaiting data from well-designed randomized trials, which may never be performed.



Biophysical profile



wiseGEEK

Biophysical profile

fetal movement

fetal tone

fetal breathing

amniotic fluid volume

nonstress test

A total score ≥ 8 implies absence of significant central nervous system hypoxemia/acidemia at the time of testing

A score ≤ 4 can be a sign of fetal compromise



BPP

Acute or chronic?

The most common benign cause of absence of one acute parameter is quiet fetal sleep.

The more parameters that are absent (ie, the lower the BPP score), the less likely the change is due to a sleep state.

Loss of fetal breathing movements and fetal heart rate accelerations, followed by decreased fetal movement, and finally loss of fetal tone.

On average, it takes approximately 15 days for a fetus to progress from normal to reduced amniotic fluid volume (in the absence of membrane rupture) and 23 days to develop severe oligohydramnios.



Biophysical profile

fetal movement

fetal tone

fetal breathing

amniotic fluid volume

nonstress test

A total score ≥ 8 implies absence of significant central nervous system hypoxemia/acidemia at the time of testing

A score ≤ 4 can be a sign of fetal compromise



BPP

Can the nonstress test be omitted?

The acute parameters (movement, tone, breathing) are subject to fetal sleep-wake cycles; therefore, the fetus should be observed continuously for at least 30 minutes before the parameter is assigned 0 points.

Modified biophysical profile The rate of stillbirth within one week of a normal modified BPP is the same as with the full BPP

INTERPRETATION

10/10, 8/8 (nonstress test not done), or 8/10 (including +2 points for amniotic fluid) is a normal test result: The risk of fetal death within one week if the fetus is not delivered is low (0.4 to 0.6/1000 births)

Fetal death after a normal BPP

6/10 (including +2 points for amniotic fluid) is an equivocal test result,

The test is repeated within 24 hours

If the patient is at or near term, delivery is a reasonable option

5/10 to 4/10 is abnormal; the risk of fetal asphyxia within one week is 91/1000 if there is no intervention.



factors potentially affecting test results

Antenatal corticosteroids

Subclinical infection?

Fasting



Biophysical profile Management

10 Repeat test weekly except in diabetics and postterm pregnancy

8/10 Repeat testing per protocol

(NL AFV)

6 NL AFV >36w with favorable cervix, deliver
<36w repeat in 24 h
repeat test ≤ 6 , deliver
repeat test >6 observe and Repeat testing per protocol

4 Repeat testing same day if BPP ≤ 6 , deliver

0 to 2 Deliver

Amniotic Fluid Volume Estimation



Amniotic fluid volume

CLINICAL SIGNIFICANCE OF ABNORMAL AFV

- Abnormal AFV may suggest fetal congenital anomalies (eg, gastrointestinal or urinary tract obstruction, renal abnormality), chromosomal abnormalities (eg, trisomy 18), and fetal growth restriction.

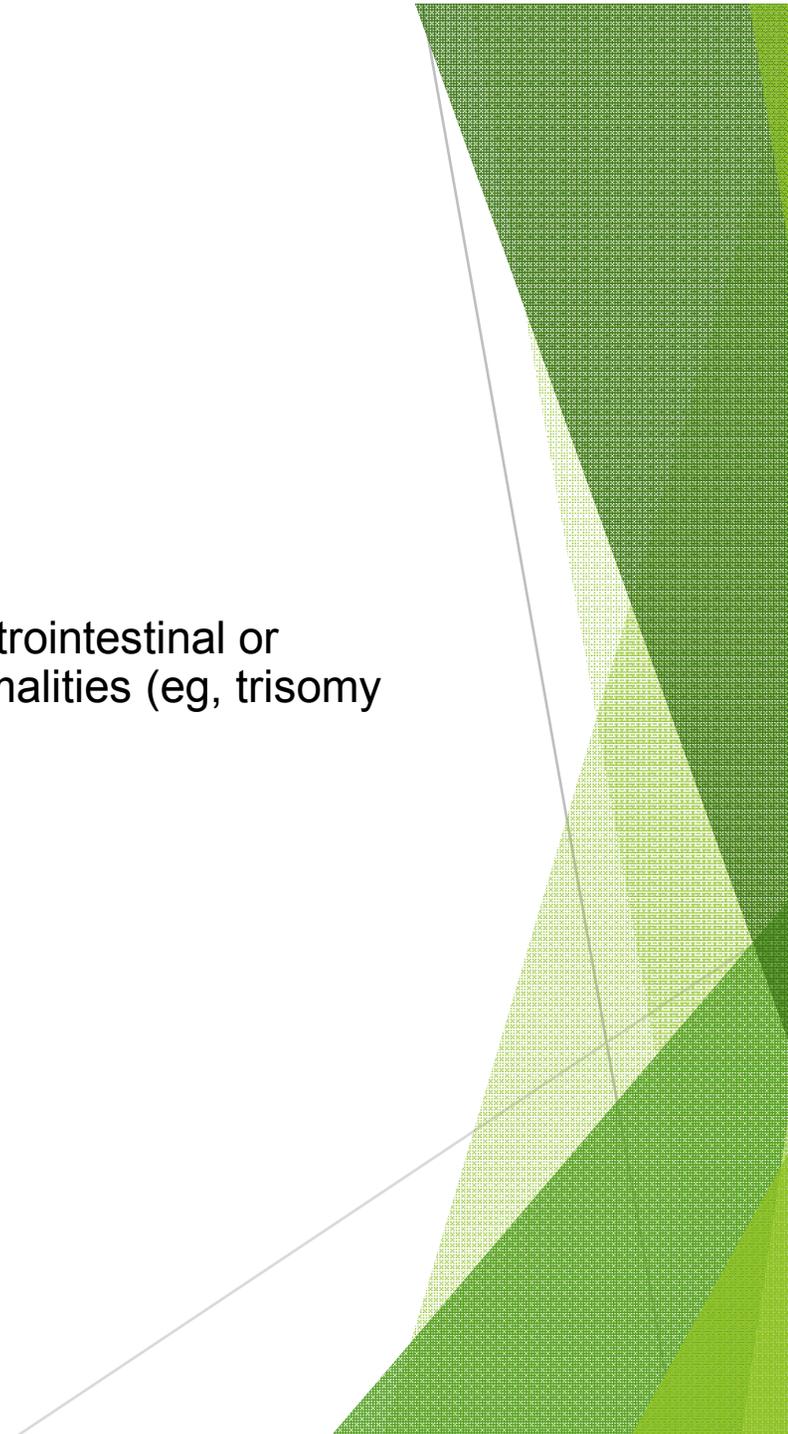
ULTRASOUND ESTIMATION OF AFV

Qualitative assessment

Semi-quantitative methods

Single deepest pocket

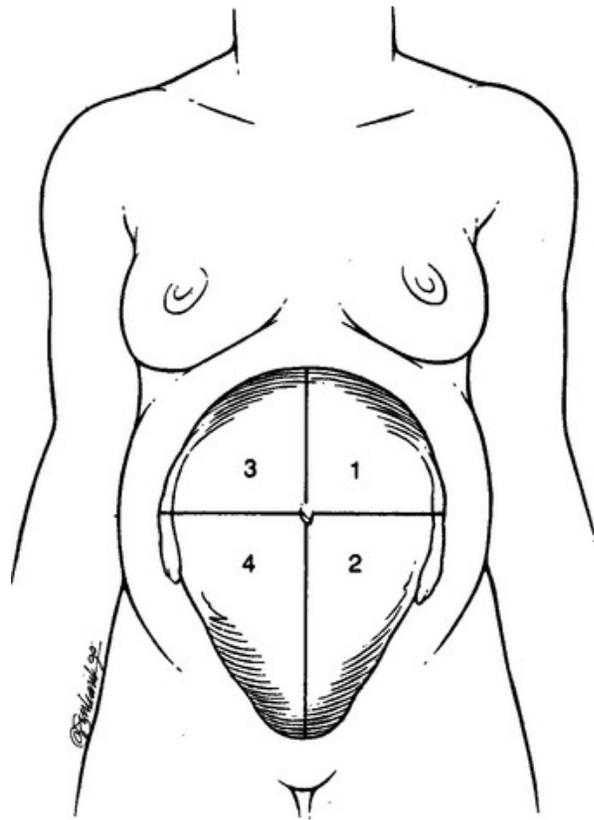
Amniotic fluid index



Maximum deepest pocket



Deepest pocket in cm
Do not include cord or fetal limbs



Amniotic fluid volume

Amniotic fluid index

Oligohydramnios – AFI ≤ 5 cm

Normal – AFI > 5 cm and < 24 cm

Polyhydramnios – AFI ≥ 24 cm

Single deepest pocket

Oligohydramnios – Depth < 2 cm

Normal – Depth ≥ 2 cm and < 8 cm

Polyhydramnios – Depth ≥ 8 cm



