

Obstetrics & Gynecology TEAM



Antepartum Intrapartum Fetal Monitoring

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◆ very important ◆ mentioned by doctor ◆ team notes ◆ not important

- **Aim Of Fetal Assessment:** Ensure fetal wellbeing (Identify patients at risk of fetal asphyxia) > to prevent prenatal mortality & morbidity.
 - Asphyxia: a lack of oxygen or excess of carbon dioxide in the body that is usually caused by interruption of breathing and that causes unconsciousness
- **Screening For High Risk Pregnancy**
 - History (history of previous abnormal baby, past medical history, any associated risk factor)
 - Age (about 35 and more associated with higher risk of mortality and morbidity rate, higher risk of chromosomal abnormalities and higher risk of malformation, chronic diseases)
 - Social burden
 - Smoking
 - Past medical conditions e.g D.M, HTN
 - Past Obstetric history (previous abnormal baby, IUGR , fetal death..)
- **Fetal And Neonatal Complications Of Antepartum Asphyxia**
 - Stillbirth (Mortality) (it is a death of the fetus after 24 weeks of pregnancy / within labor or at the first day after delivery)
 - Metabolic acidosis at birth
 - Hypoxic renal damage
 - Necrotizing enterocolitis
 - Intracranial haemorrhage
 - Seizures
 - Cerebral palsy
- **Conditions Associated With Increased Perinatal Morbidity/Mortality**
 - Small for gestational age fetus (IUGR)
 - Decreased fetal movement
 - Postdates pregnancy (>294 days)
 - Pre-eclampsia/chronic hypertension
 - Pre-pregnancy diabetes
 - Insulin requiring gestational diabetes
 - Preterm premature rupture of membranes
 - Chronic (stable) abruption
- **When To Start Fetal Assessment Antenatally**
 - Risk assessed individually
 - For D.M. fetal assessment should start from 32 weeks onward if uncomplicated
 - **If complicated D.M. start at 24 weeks onward.. MCQ**
 - For Post date pregnancy start at 40 weeks
 - For any patient with decrease fetal movements start immediately
 - Fetal assessment is done once or twice weekly

▪ **Antenatal Fetal Assessment**

1. Fetal movement counting
2. Non stress test
3. Contraction stress test
4. Ultrasound fetal assessment
5. Umbilical Doppler Velocimetry

➤ **Fetal Movement Counting**

1. **Cardiff technique:** Done in the morning, patient should : calculate how long it takes to have 10 fetal movement
 ** 10 movements should be appreciated in 12 hours if it less than 10 movements the patient at risk.
2. **Sadovsky technique:** For one hour after meal the woman should lie down and concentrate on fetal movement , 4 movement should be felt in one hour ..If not, she should count for another hour
 ** If after 2 hours four movements are not felt, she should have fetal monitoring

➤ **Non Stress Test**

This test assesses the frequency of fetal movements using an external fetal heart rate (FHR) monitoring device to detect the present or absent of acceleration. “From Kaplan Lecture Notes”

*The base line fetal heart rate 120-160 beats/minute.. **MCQ**

Done using the Cardiotocometry Record for 20 minutes with the patient in left lateral position. **Why?**

- ✚ (Cardiac output is the lowest in the supine position because of the inferior vena cava compression resulting in increased cardiac return. CO is the highest in the left lateral position) “From Kaplan Lecture Notes”

1. **Reactive CTG:**

- At least two accelerations from base line of 15 bpm for at least 15 sec within 20 minutes
- ✚ Accelerations mean the fetal heart rate will increase more than the basement

2. **Non reactive:**

- No acceleration after 20 minutes > proceed for another 20 minutes
- If non reactive in 40 minutes > proceed for contraction stress test or biophysical profile
- The positive predictive value of NST to predict fetal acidosis at birth is 44%

Table 12-1. Nonstress Test (NST)

Reactive NST	Criteria: ≥2 accelerations in 20 min: ↑ FHR ≥15 beats/min and lasting ≥15 seconds
	Assessment: reassuring of fetal well-being
	Follow-up: repeat weekly/biweekly
Nonreactive NST	Criteria: no FHR accelerations or did not meet criteria
	Assessment: sleeping, immature, or sedated fetus; acidotic, compromised fetus?
	Follow-up: VAS
	If still NR: do CST or BPP

Definition of abbreviations: BPP, biophysical profile; CST, contraction stress test; FHR, fetal heart rate; VAS, vibroacoustic

➤ Contraction Stress Test

- Fetal response to induced stress of uterine contraction and relative placental insufficiency
- ✚ The aim of that to see the response of fetal heart rate with those contractions
- **Should not be used in patients at risk of preterm labor or placenta previa**
- Should be preceded by NST.. Why? **To check if there are already contractions**
- Contraction is initiated by nipple stimulation or by oxytocin I.V.
- The objective is 3 contractions in 10 minutes **“Definition of normal labor”**
- If late deceleration occur > positive CST

1.

Table 12-2. Contraction Stress Test (CST)

Negative CST	No late decelerations are seen in the presence of 3 uterine contractions in 10 min
	Assessment: reassuring of fetal well-being
	Follow-up: repeat CST weekly as needed
Positive CST	Repetitive late decelerations are seen in the presence of 3 uterine contractions in 10 min
	Assessment: worrisome, especially if nonreactive non-stress test
	Follow-up: prompt delivery

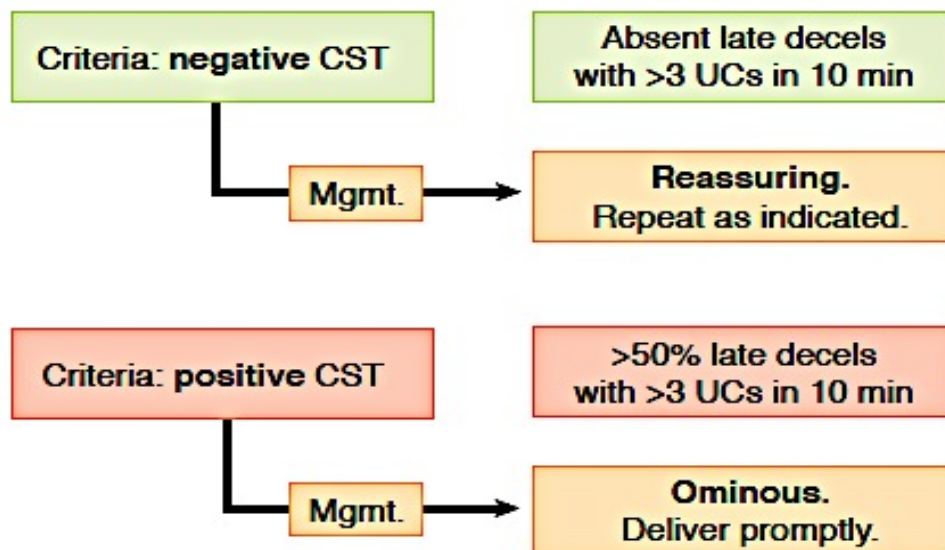


Figure I-12-2. Contraction Stress Test

▪ Interpretation of CTG (important and you have to memorize all the definitions)

- Normal Baseline FHR 110–160 bpm
 - Moderate bradycardia 100–109 bpm
 - Moderate tachycardia 161–180 bpm
- Occure with Hypoxia, Chorioamnionitis, Maternal fever , B-Mimetic drugs, Fetal anaemia,sepsis,ht failure,arrhythmias
- Abnormal bradycardia < 100 bpm
 - Abnormal tachycardia > 180 bpm

▪ Deceleration

1. **Early deceleration:** occurring at the same time as the contractions.

Ex: **Head Compression.. OSCE & MCQ**

✚ That occur at delivery at the second stage when the head pass through the bone pelvis

2. **Late deceleration:** persisting after contraction has finished.

Ex: U-Placenta Insufficiency

3. **Variable deceleration:** variation in shapes and timing.

Ex: Cord Compression, Primary CNS Dysfunction.

▪ Partogram

It is a sheet of paper in the delivery room to Evaluate the progression of labor **MCQ** including :

- Iv fluids & avoid oral intake
- Maternal vital signs every 1-2 hours
- Input-output monitoring
- Analgesia
- Fetal heart rate monitoring (CTG)
- Uterine contractions monitoring
- Vaginal examination for cervical dilatation & position inactive phase every 2 hours
- Amniotic membranes status & amniotic fluid colour

➤ Ultrasound Fetal Assessment

- From kaplan lecture notes

MODALITIES

- **Transvaginal sonogram:** used in first trimester, producing high-resolution images that are not influenced by maternal BMI. Dating accuracy of first trimester sonogram is +/- 5 days.
- **Transabdominal sonogram:** used any time during the pregnancy, but image quality may be limited by maternal obesity. No adverse fetal effects have been noted during decades of research studies. Dating accuracy of early second trimester sonogram is +/- 7-10 days.
- **Doppler ultrasound studies:** used to assess umbilical artery (UA) and middle cerebral artery (MCA) blood flow. This modality assesses fetal well-being in IUGR pregnancies as well as fetal anemia in alloimmunized pregnancies.

• Assessment Of Growth

1. Biometry:
 1. Biparietal diameter (BPD)
 2. Abdominal Circumference (AC)
 3. Femur Length (FL)
 4. Head Circumference (HC)
2. Amniotic fluid
3. Placental localization, why is it important?
To detect placenta previa (land marks: bladder and cervix)

➤ Biophysical Profile (BPP)

“from Kaplan lecture notes” A complete BPP measures 5 components of fetal well-being: NST, amniotic fluid volume, fetal gross body movement, fetal extremity tone, and fetal breathing. The last 4 components are assessed using obstetric ultrasound. Score given for each component are **0 or 2**, with maximum possible score 10 and minimum score 0.

1. **Score of 8 – 10** highly reassuring of fetal well-being. Management is to repeat the test weekly or as indicated.
2. **Score of 4 – 6** worrisome. Management is delivery if the fetus is ≥ 36 weeks or repeat the BPP in 12-24 h if < 36 weeks. An alternative is to perform a CST.
3. **Score of 0 – 2** highly predictive of fetal hypoxia, management is prompt delivery regardless of gestational age.

“ From First Aid”

A biophysical profile (BPP) is the combination of the non-stress test and an ultrasound exam, for a total of five components:

1. **NST:** Appropriate variation of fetal heart rate.
2. **Breathing:** ≥ 1 episode of rhythmic breathing movements of 30 sec or more within 30 min.
3. **Movement:** ≥ 3 discrete body or limb movements within 30 min.
4. **Muscle tone:** ≥ 1 episode of extension with return to flexion or opening/closing of a hand.
5. **Determination of amniotic fluid volume:** Single vertical pocket of amniotic fluid measuring ≥ 2 cm is considered adequate* (or an amniotic fluid index > 5 cm).

Each of the category is given a score of 0 or 2 points:

- 0:** Abnormal, absent, or insufficient.
2: Normal and present as previously defined.

Total possible score is 10 points.

- _ Normal score: 8–10.
- _ Equivocal: 6.
- _ Abnormal: ≤ 4 .

Test Score Result	Interpretation	Management
10 of 10 8 of 10 (normal fluid) 8 of 8 (NST not done)	Risk of fetal asphyxia extremely rare	Intervention for obstetric and maternal factors
8 of 10 (abnormal fluid)	Probable chronic fetal compromise	Determine that there is functioning renal tissue and intact membranes. If so, delivery of the term fetus is indicated. In the preterm fetus less than 34 weeks, intensive surveillance may be preferred to maximize fetal maturity.
6 of 10 (normal fluid)	<u>Equivocal</u> test, possible fetal asphyxia	Repeat test within 24 hr
6 of 10 (abnormal fluid)	Probable fetal asphyxia	Delivery of the term fetus. In the preterm fetus less than 34 weeks, intensive surveillance may be preferred to maximize fetal maturity
4 of 10	High probability of fetal asphyxia	Deliver for fetal indications
2 of 10	Fetal asphyxia almost certain	Deliver for fetal indications
0 of 10	Fetal asphyxia certain	Deliver for fetal indications

□ Umbilical Doppler Velocimetry

Use a free loop of umbilical cord to measure blood flow in it

- **Indication:**

- IUGR
- PET
- D.M.
- Any high risk pregnancy

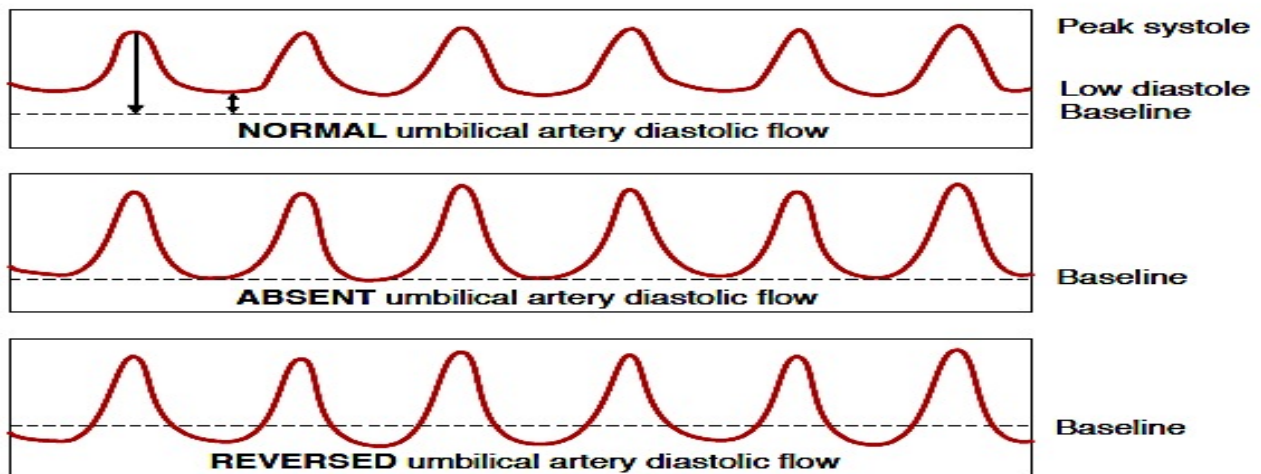


Figure I-12-3. Umbilical Artery Doppler Waveform Patterns

1. Doppler Velocimetry “ From First Aid”

Doppler sonography is a noninvasive technique used to assess fetal hemodynamicvascular resistance by imaging specific fetal vessels:

- Umbilical artery (UA) and umbilical vein.
- Aorta.
- Heart.
- Middle cerebral artery (MCA).
- **Commonly measured flow indices are:**
 - Peak systolic frequency shift (S).
 - Peak diastolic frequency shift (D).
 - Mean peak frequency shift over the cardiac cycle (A).
 - Systolic to diastolic ratio (S/D).
 - Resistance index (S-D/S).
 - Pulsatility index (S-D/A).
- **Flow velocity waveforms differ in normal-sized fetuses as compared to those suffering from growth restriction:**
 - Fetuses with normal growth: High-velocity diastolic flow.
 - Fetuses with restricted growth: ↓ velocity diastolic flow, ↑ flow resistance (↑ S/D) in umbilical artery and ↓ resistance (↓ S/D) in MCA.
 - Very severe intrauterine growth restriction: Flow may be absent or even reversed.
 1. **Abnormal flow is usually the result of placental insufficiency and dysfunction, resulting in fetal hypoxia and acidosis. This may induce the phenomenon of brain sparing:**
 - ↑ S/D in umbilical artery (↑ resistance).
 - ↓ S/D in MCA (↓ resistance).
 - Adaptive response to fetal hypoxemia.