Chapter 6
Perinatal Care

What is the goal of perinatal care?
- The care of women and fetus or newborn given; before, during, and after delivery; from the 28th week of gestation through the seventh day after delivery
- Fetal health
- Recognizing diseases and intrauterine treatment
- First trimester fetal life, detecting major anomalies
- Second trimester congenital anomalies, syndromes, toxic effects
- Third trimester fetal well-being

Which methods are being used for perinatal care?
- Non-stress test (NST)
- Contraction stress test (CST)
- Fetal biophysics profile (BPP)
- Amniotic fluid index (AFI)
- Doppler ultrasound
- Counting of fetal movements (kick counting)

Why is perinatal care important?
- Fetal death is seen in 1% of all third trimester low-risk pregnancies without routine perinatal care.
- Two thirds of deaths are intrauterine, and this rate increases especially in high-risk patients.

Which pregnancies are considered as high-risk pregnancies in the aspect of uteroplacental insufficiency?
- Prolonged pregnancy
- Diabetes mellitus (DM)
- Hypertension (HT)

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- Isoimmunization
- Stillbirth in previous pregnancies
- Intrauterine growth restriction (IUGR)
- Advanced mother age
- Discordant multiple pregnancy, as in twin-to-twin transfusion syndrome (TTTS)
- Antiphospholipid syndrome (APS)

Describe the role of non-stress test (NST) in perinatal care

- A good test interpreted as reactive. There should be:
  - At least two fetal movements
  - At the same time two accelerations lasting 15 s and not less than 15 beats/min in 20 min of monitoring for reactivity
- Fetal heart rate: 120–160/min
- In some fetuses, 110–120/min fetal heart beats can also be considered as normal
- May be physiologically non-reactive NST before 30th gestational week

What is the role of the stress test (CST) in evaluating fetal well-being?

- It is the most precious test for the evaluation of fetal well-being.
- Blood flow to intervillous area decreases during uterine contractions.
- Blood supply decreases up to 30%.
- If there is no placental insufficiency, the baby responds to it as acceleration.
- Responds as deceleration if there is insufficiency.

How would you apply contraction stress test (CST)?

- Test is done by creating contractions, three contractions within 10 min.
- Oxytocin is given to form contraction, or nipple stimulation.
- Should be laid semi-Fowler and 30–45° lateral position to avoid supine hypotension.
- The CST is used for its high negative predictive value.

What is the meaning of positive CST?

- Late decelerations present with more than half of the uterine contractions. Generally it shows placental respiratory insufficiency is present.

What is the meaning of negative CST?

- No late deceleration presents with adequate uterine contractions present. Generally marker of fetal well-being.

What are the contraindications of contraction stress test (CST)?

- It should not be done to patients who are at risk of premature birth.
- Premature rupture of membranes (PROM).
- Multiple pregnancy.
- Pregnant with vaginal bleeding.
- Cervical cerclage.
- Preterm labor.

- Placenta previa or ablation placenta.
- Patients who previously had C/S with vertical (classical uterine) incision.
- Previous history of myomectomy.

What are the evaluation criteria of CST?

Comment	Criteria	Incidence (%)
Negative	3 contractions/10 min No deceleration	80
Positive	Deceleration with 50% contraction	3–5
Suspicious	Temporary deceleration	5
Hyperstimulation	More than 5 times deceleration with contraction in 10 min	5
Insufficient	Fewer than three contractions occur within 10 minutes, or quality of tracing is inadequate for accurate interpretation. Repeat test on the following day.	5

What are the parameters of fetal biophysical profile (BPP) evaluation?

Parameter	Normal (2 points)	Abnormal (0 point)
NST	Reactive	Non-reactive
Fetal respiration	Lasting for 30 s at 30 m	No movement or less than 30 s
Movement	At least three fetal movement	Reduced movements
Tonus	Extension, flexion Opening and closing of hands	Continuous extension and open fingers
Amnion fluid	At least 2 cm of pocket in two planes	Less fluid

- If the score is 10, probability of fetal death in 2 weeks is 0%.
- If the score is 0, probability of fetal death is around 60%.

What are the parameters in the modified fetal biophysical profile (BPP)?

- NST and Amniotic fluid index (AFI) measurements: also indicators for fetal well-being.

What are the features of the amniotic fluid volume?

- 200 mL at 16th week.
- 1000 mL at the beginning of the third trimester.
- Weekly decreases by 150 mL after 38 weeks.
- Renewed about 95% per day.
- It is directly related to uteroplacental blood flow.
- If uteroplacental blood flow decreases, fetal renal blood flow and fetal renal glomerular filtration rate (GFR) also decreases so oligohydramnios occurs.
- It is the sum of the deepest pockets on the four uterine quadrants.
- Perinatal mortality and morbidity increased in patients with Amniotic fluid index (AFI) below 5 cm.

How would you advise your patient to count fetal movements?
- Fetal movements/kicks indicate fetal well-being.
- Fetal movements may decrease due to the decrease of amnion fluid in the third trimester.
- Fetal movements should be at least 10 per day.

Which vessels are measured by Doppler velocimetry?
- Uterine artery
- Umbilical artery
- Fetal middle cerebral artery (MCA)
- Umbilical vein
- Ductus venosus (DV)

What are the characteristics of Doppler measurement?
- Ultrasound sound waves hit the blood, and moving elements like erythrocytes turn back those waves.
- Frequencies of the outgoing sound waves and returning sound waves are different.
- This is called the Doppler effect, and the frequency change is called the Doppler frequency.
- Blood flow in the ultrasound is measured by measuring the movement of blood flow.
- A sound wave is sent from the transducer to capture blood flow.
- The echoes obtained from the fixed tissues through which the sound wave passes are always the same.
- Echoes obtained from moving tissues such as blood vary according to the return of the signal to the recipient.

Which Doppler indexes are used during pregnancy?
- Systole/diastole (A/B).
- Pulsatility index (S-D/mean).
- It is difficult to calculate, but it is the most reliable measurement in very small vessels or vessels without diastole flow. It can be easily calculated.
- Resistance index (S-D/S).

Relationship between fetal circulation and Doppler ultrasound?
- Diastole flow of umbilical artery increases near term.
- High S/D ratio is a very important parameter in IUGR.
- Excessively affected fetuses do not have diastolic flow or have reverse flow.

Explain the importance of Doppler measurement for ductus arteriosus.
- Doppler measurement of Ductus arteriosus should be considered as primary in the use of indomethacin and other nonsteroidal anti-inflammatory drugs, due to the side effect of the prostaglandin inhibitors (PGI) that is early closure of ductus arteriosus. Indomethacin is used for tocolysis and in the treatment of polyhydramnios.
- Indomethacin causes constriction at ductus arteriosus, to increase in pulmonary flow and reactive pulmonary arteriolar hypertrophy; pulmonary hypertension.
- If the medication is discontinued before 32nd week, this condition is resolved.

In which case is Doppler measurement of the mid cerebral artery (MCA) used?

- Peak systolic velocity (PSV) increases (>1.5 MoM) in case of fetal anemia—due to increased cardiac output and decreased blood viscosity.
- MCA/placental blood flow rate may be used depending on the brain protective effect in the presence of fetal hypoxemia.

In which situations uterine artery Doppler measurement is used?

- In normal pregnancy, uterine blood flow increases from 50 mL/min to 500–700 mL/min.
- Uterine blood flow is characterized by high diastolic blood flow.
- Increased resistance and presence of diastolic notch indicate hypertension.
- Pregnancies that will develop HT or preeclampsia may be predicted in Doppler measurements performed at 16–20th gestational ages.

What is the most valuable test for evaluating fetal well-being?

- CST

What is the mechanism of late deceleration in NST or CST?

- In fetuses with reduced oxygen reserve, periodic decreases in oxygen during contractions reach the critical level, which trigger the carotid chemoreceptors. As a reflex, an alpha sympathetic response that constricts the low-resistance arterial bed is initiated. This results in a systemic arterial hypertension that causes the baroreceptors to produce a vagal response that slows down the fetal heart rate and is seen as a late deceleration.

Suggested Reading

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