CLINICAL MONITORING OF MATERNAL AND FETAL WELLBEING

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- Antepartum fetal surveillance is the assessment of fetal well being in utero before the onset of labor
- Early detection of fetus at risk so that timely management to prevent further deterioration
- Also find out normal fetuses and avoid unnecessary interventions

INDICATIONS OF FETAL SURVELLIANCE

- Maternal conditions
- Hypertension
- Diabetes mellitus
- Heart Disease
- Chronic renal disease
- Acute febrile illness
- Pneumonia /asthma
- Epilepsy

- Collagen vascular disease
- Sickle cell disease
- Antiphospholipid syndrome
- Drug Abuse
- FETAL CONDITIONS
- Fetal growth restriction
- Rh isoimmunisation
- Fetal Cardiac arrythmia

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TESTS OF FETAL WELL BEING

- Fetal movement count
- Cardiotocography
- Non stress test
  - Vibroacoustic stimulation assessment
  - Contraction stress test
  - Nipple stimulation test
- Usg
  - Amniotic fluid assessment
  - BPP
- Doppler studies
- Biochemical testing

FETAL MOVEMENT COUNT

- Cardiff 10 count
- Daily fetal movement count-post meal

NON STRESS TEST(NST)

- Most commonly used method
- Incorporated into biophysical profile
- Utilises principle of Doppler effect in which sound waves hit a moving objects are reflected back at an altered frequency
- Woman in left lateral or semi recumbent position
- External transducer for recording FH rate
- Tocodynamometer –recording uterine activity attached to maternal abdomen
- Carried out for a period of 20 mints

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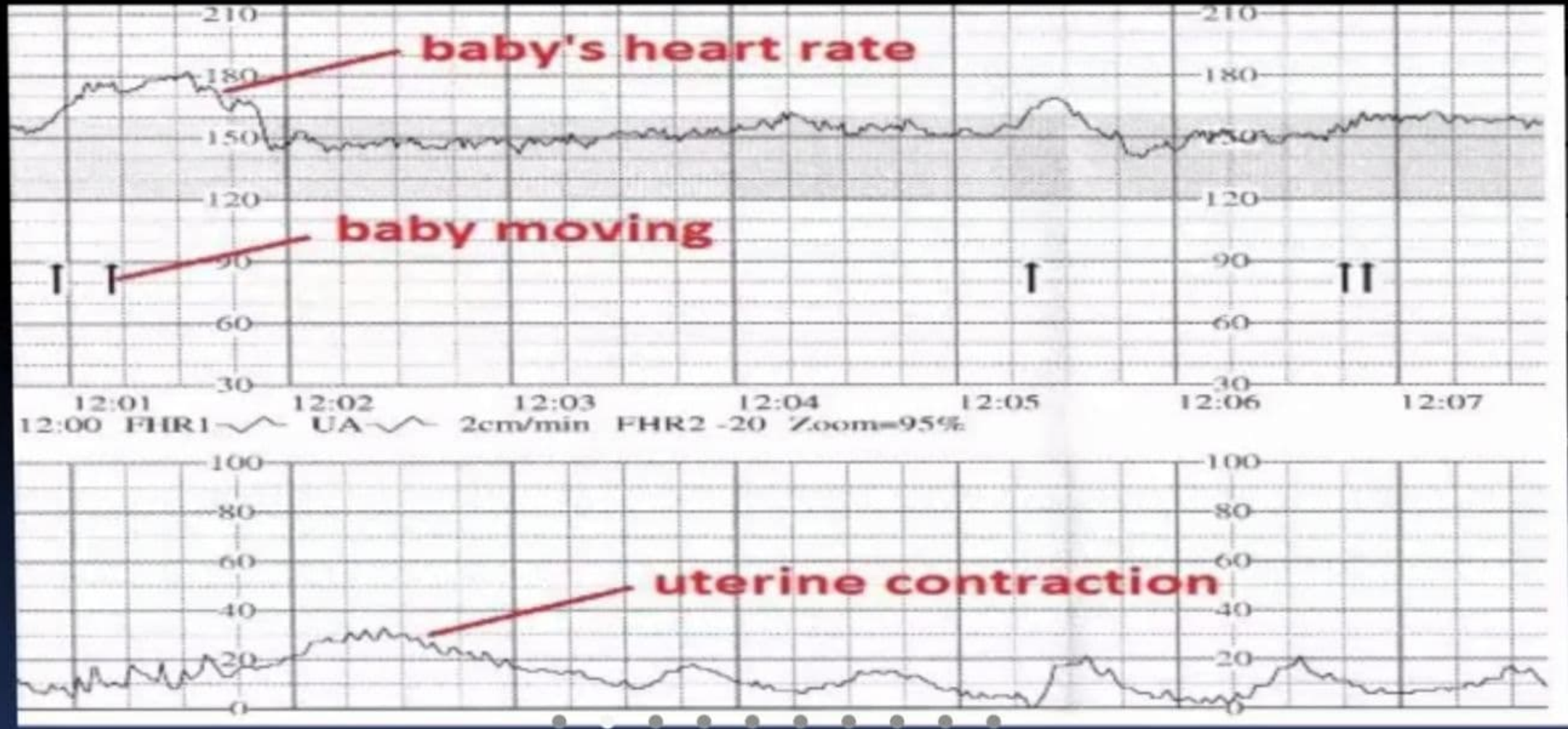
NON STRESS TEST

- Fetal heart rate pattern represented on paper
- Fetal heart rate acceleration in relation to fetal movement is a sign of fetal health
- This reactivitivity denotes CNS activity
- Its absence depicts hypoxia ,drugs,fetal sleep,congenital anomalies
- Observed for 20 minutes but extended to 40 min if there are no accelerations in 20 minutes

- Variables studied
- Baseline fetal heart rate
- Variability
- Presence or absence of accelerations
- presence of decelerations

REACTIVE NST

- Baseline fetal heart rate between 110 to 160 bpm
- Baseline variability > 5 bpm
- Two or more accelerations of 15 bpm lasting 15 seconds in 20 minutes period
- No decelerations
- NST shd be done after 28 weeks as it is nonreative in 50% cases before that
- It is a screeing test with false positive rate of 50% and false negative rate of .3%


baby's heart rate
baby moving
210
180
150
120
90
60
30
12:01
12:02
12:03
12:04
12:05
12:06
12:07
12:00 FHR1 UA 2cm/min FHR2 -20 Zoom=95%
uterine contraction
100
80
60
40
20
0

VIBROACOUSTIC STIMULATION TEST

- Done by artificial larynx 80-100db
- It reduces the testing time and false positive by 2%

CONTRACTION STRESS TEST

- To see the fetal response to uterine contractions
- Fetal oxygenation is transiently worsened by uterine contraction

CONTRACTION STRESS TEST

- Indication is nonreactive non stress test
- Contraindications
- Patient with risk of preterm labour
- PROM
- H/O uterine surgery,classical caesarean section
- Known placenta previa,multiple gestation,cervical incompetence,vasa previa

- Oxytocin infusion is given till there are 3 contractions in 10 minutes
- Rarely done now days
- Negative-no late or variable decelerations
- Positive-late deceleration in > 50% of the contractions
- Nipple stimulation test is the same as oxytocin stress test
- Interpretation is same

BIOPHYSICAL PROFILE

	SCORE 2	SCORE 0
1 non stress test	2 or more accelerations of 15 bpm lasting 15 sec in 20-40 min	nil or one acceleration
2 fetal breathing movement	One or more episode of sustained breathing movement for 30 sec	Less than 30 sec of breathing movement
3 fetal movement	3 or more discrete body or limb movement within 30 minutes	Less than 3 discrete movement in 30 minutes
4 fetal tone	One or more episode of limb extension or opening or closing of a hand within 30 minutes	No movement or no extension or flexion in 30 minutes
5 amniotic fluid volume	Single vertical pocket of more than 2 cm	Largest vertical pocket of 2 cm or less

Management of BPP

	Interpretation
If score is 10	Fetus is normal repeat weekly.in DM and post term biweekly
If score is 8	Oligohydramnios is an indication of delivery otherwise repeat weekly
If score is 6	Suspect asphysia, if > 36 weeks deliver
If score is 4	Deliver usually caesarean
If score is 2	Deliver caesarean

MODIFIED BIOPHYSICAL PROFILE

- Combines NST and Amniotic fluid index
- Takes only 10 minutes to perform
- It is reactive if the NST is reactive and AFI is more than 5.it is then repeated once a week or earler if clinicaly required
- It is abnormal if AFI is less or NST is non reactive. Then a BPP is done

DOPPLER STUDIES

- Uterine arteries to predict placental insufficiency later on
- Umblical arteries in fetal growth restriction,preeclampdia ,DM,reduced fetal movement ....
- MCA in fetal growth restriction and rh isoimmunisation
- Ductus venosus and umblical veins for fetal growth restriction

UMBILICAL ARTERY DOPPLER

- Systolic component reflects cardiac pump
- Diastolic component- fetal vascular bed(placenta)
- Umbilical artery is a placental not a fetal Doppler
- Characterised by forward flow typical of low resistance circuit
- As gestation increases, there is gradual fall in all resistance indices-due to increase in end diastolic flow(EDF)
- Due to normal changes that occur in pregnancy

MIDDLE CEREBRAL ARTERY

- In normal fetus, increased resistance in MCA as shown by increase in resistance indices(PI,RI and S/D ratio)
- When there is hypoxic stress the resistance decreases in MCA causing the resistance indices to decrease
- Thought to be due to fetus redistributing the blood flow to brain and heart- brain sparing effect
- This term is a misnormer

- Actually due to vasodilatation in the brain which is the marker of hypoxia
- MCA valuable for diagnostics and prediction of adverse outcome in late offset FGR
- If MCI PI is abnormal- poor neuro behavioural competence at two years of age
- In late onset FGR MCI indices may be abnormal when UA resistance is normal
- In fetel anemia due to RH iso immunisation the peak systolic velocity in MCA is increased
- Decreased MCA PI best predictor of hypoxia and fetal anemia at cordocentesis

UTERINE ARTERY DOPPLER

- In non pregnant state there is reduced diastolic flow and notching of uterine arteries
- In normal pregnancy this notch disappears and flow increases
- Two important applications of UA Doppler- diagnosis of FGR and prediction of pre eclampsia and FGR

VENOUS DOPPLER

- DUCTUS VENOSUS
  - A vessel which always has forward flow towards the heart
  - Three waves of ductus venosus
    - S Wave- correspond to right atrial filling in ventricular systole
    - D Wave- passive ventricular filling during early diastole
    - A Wave- corresponds to atrial systol
  - Abnormalities are a sign of fetal compromise and immediate intervention required
  - Reversal of flow indicates impared cardiac function and impending fetel death

MATERNAL SURVELLIANCE

- DETAILED HISTORY REGARDING
  - Vital data
  - Obstetric formula
  - POG
  - Presenting complaint
  - History of present pregnancy
  - Menstrual history
  - Marital history
  - Previous obstetric pregnancy
  - Previous medical and surgical history
  - Family history

- Clinical examination comprises general examination, systemic examination and obstetric examination
- GENERAL EXAMINATION-
  - Height, weight, BMI
  - Other components include pallor, jaundice, cyanosis, pedal edema and varicosities of legs
  - Examination of breast
  - Pulse, blood pressure, RR , temperature
- SYSTEMIC EXAMINATION
  - CVS, RS,CNS, PA

- OBSTETRIC EXAMINATION
  - INSPECTION
    - Longitudinal or transverse distantion
    - Fullness of flanks
    - Shelving
    - Striae gravidarum
    - Linea niagra
    - Position of umbilicus
    - Scars of previous surgery
  - PALPATION
    - Height of fundus
    - SFH
    - Leopolds manoeuvres

- ESTIMATED FETAL WEIGHT
- ABDOMINAL GIRTH
- AUSCULTATION