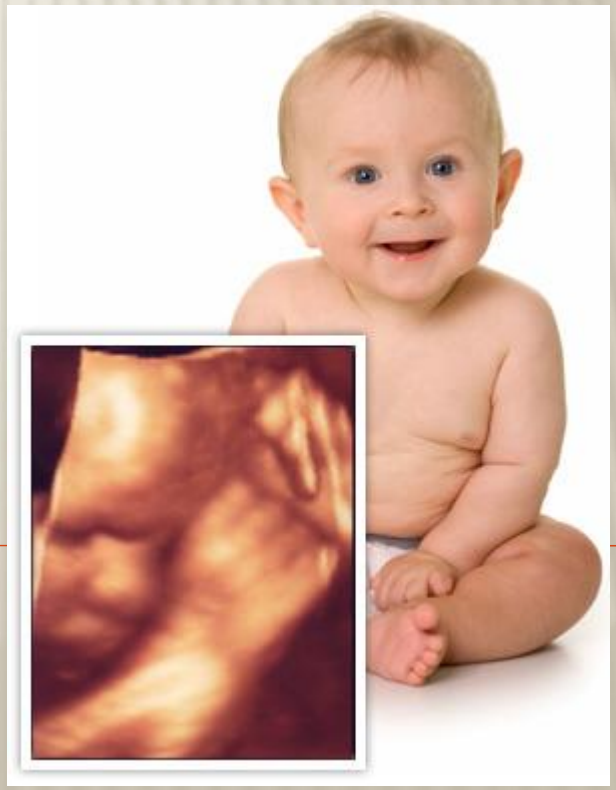
King Saud University Medical City
Department of Obstetrics & Gynecology
Course 482

FETAL ASSESSMENT



FETAL ASSESSMENT

- Fetal assessment is to identify fetuses at risk of neurologic injury or death in order to prevent it
- It can be divided into:

-early pregnancy fetal assessment

-late pregnancy fetal assessment

OR

-assessment of low risk pregnancy

-assessment of high risk pregnancy

AT BIRTH THIS IS WHAT WE WANT TO SEE

RATIONAL

- fetal oxygenation challenged:

- blood flow directed to brain, heart & adrenal & blood flow away from the kidney ➡ decrease fetal urine production ➡ decrease AF volume.

- CNS hypoxia ➡ Fetal movement decrease

-chemoreceptor's ➡ vegally-mediated reflex ➡

Fetal heart rate abnormality late deceleration.

EARLY PREGNANCY ASSESSMENT

Fetal heart activity

- fetal auscultation (special stethoscope or doppler)

~12weeks

- fetal heart activity seen by USS

Can be seen from 6weeks

EARLY PREGNANCY ASSESSMENT

Fetal movement

- Fetal movement are usually first perceptible to mother ~17w-20w (quickening)
- 50% of isolated limb movements are perceived
- 80% of trunk and limb movements

Fetal growth

- SFH
- USS

LATE PREGNANCY ASSESSMENT

- Fetal movement counting kick chart
- Contraction stress test CST
- Non stress test NST
- Doppler Velocimetry UAV
- amniotic fluid index AFI

Indications for antepartum fetal surveillance

Maternal
Antiphospholipid syndrome
Poorly controlled hyperthyroidism
Hemoglobinopathies
Cyanotic heart disease
Systemic lupus erythematosis
Chronic renal disease
Type 1 diabetes mellitus
Hypertensive disorders
Pregnancy complications
Preeclampsia
Decreased fetal movement
Oligohydramnios
Polyhydramnios
Intrauterine growth restriction
Postterm pregnancy
Isoimmunization
Previous unexplained fetal demise
Multiple gestation

Adapted from data in American College of Obstetricians and Gynecologists. Antepartum fetal surveillance. Practice Bulletin #9, October 1999.

FETAL MOVEMENT COUNTING

- It should be started ~28w in normal pregnancy

&~24w in high risk pregnancy

- It can reduce avoidable stillbirth

CARDIFF TECHNIQUE

-10 movement in 12 hours

-If abnormal patient should get further assessment

SADOVSKY TECHNIQUE

-4 movement /hour if not felt another hour

If not patient need more assessment

CONTRACTION STRESS TEST (CST)

- Causing uterine contraction over 20minutes
- At least 2 uterine contractions
- Uterine contraction restrict O2 delivery to the fetus
- Normal fetus will tolerate contraction
- Hypoxic fetus will have late deceleration
- High false positive rate ~50%
- 100% true negative rate

NON STRESS TEST (NST)

- Maine advantage over CST is no need for contraction
- False +ve & false –ve higher than CST
- done

NON STRESS TEST

- The base line 120-160 beats/minute
- Different criteria in fetuses <32w

Reactive:

At least two accelerations from base line of 15 bpm for at least 15 sec within 20 minutes

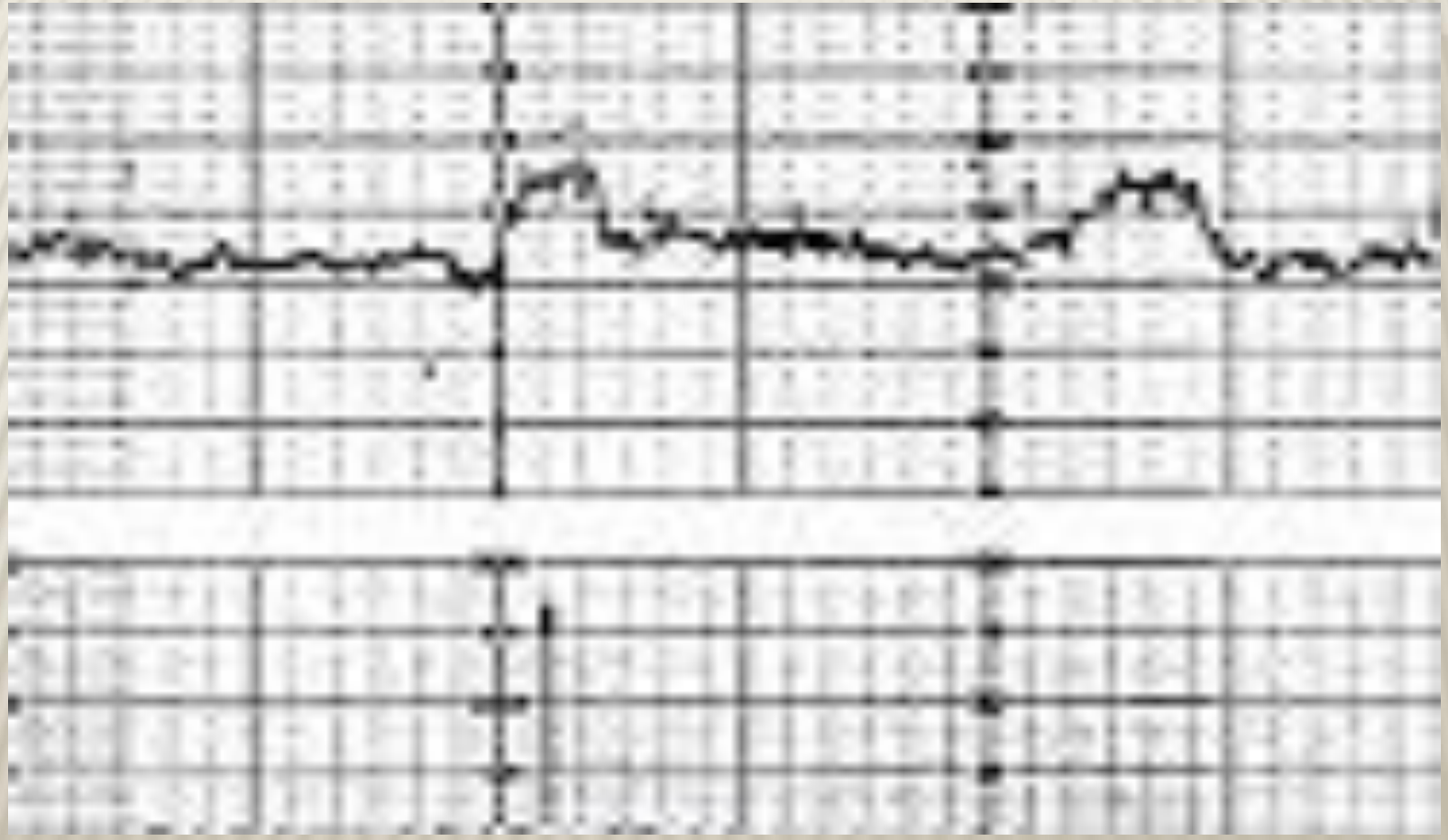
Non reactive:

No acceleration after 20 minutes- proceed for another 20 minutes

NON STRESS TEST (NST)

- 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 55%

NST



AMNIOTIC FLUID VOLUME ~AFI

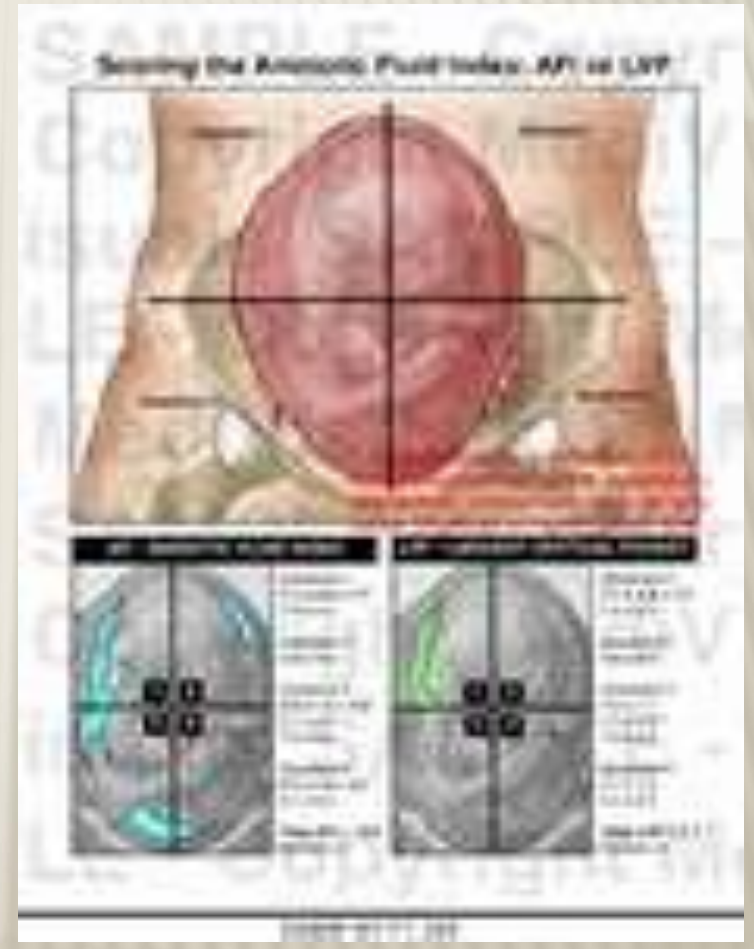
- Amniotic fluid index AFI

-the sum of the maximum vertical fluid pocket diameter in four quarters

-the normal value 5-25cm

-<5~ oligohydraminous

->24cm polyhydraminous


Sensing the Amniotic Fluid Index- AFI or LVP

BIOPHYSICAL PROFILE (BPP)

- Combines NST with USS estimation AFV, fetal breathing, body movement & reflex/tone/extension-flexion movement .
- it is a scoring system
- it is done over 30minute
- It measure acute hypoxia(NST, body mov. &breathing) & chronic hypoxia (AFI)

FETAL BIOPHYSICAL PROFILE/NST+

Biophysical Variable	Normal (score=2)	Abnormal (score= 0)
Fetal breathing movements	1 episode FBM of at least 30 s duration in 30 min	Absent FBM or no episode >30 s in 30 min
Fetal movements	3 discrete body/limb movements in 30 min	2 or fewer body/limb movements in 30 min
Fetal tone	1 episode of active extension with return to flexion of fetal limb(s) or trunk. Opening and closing of the hand considered normal tone	Either slow extension with return to partial flexion or movement of limb in full extension Absent fetal movement
Amniotic fluid volume	1 pocket of AF that measures at least 2 cm in 2 perpendicular planes	Either no AF pockets or a pocket<2 cm in 2 perpendicular planes

BPP

- The risk of fetal death within 1 week if BPP is normal~ 1/1300
- Modified BPP (mBPP)

-NST & AFI

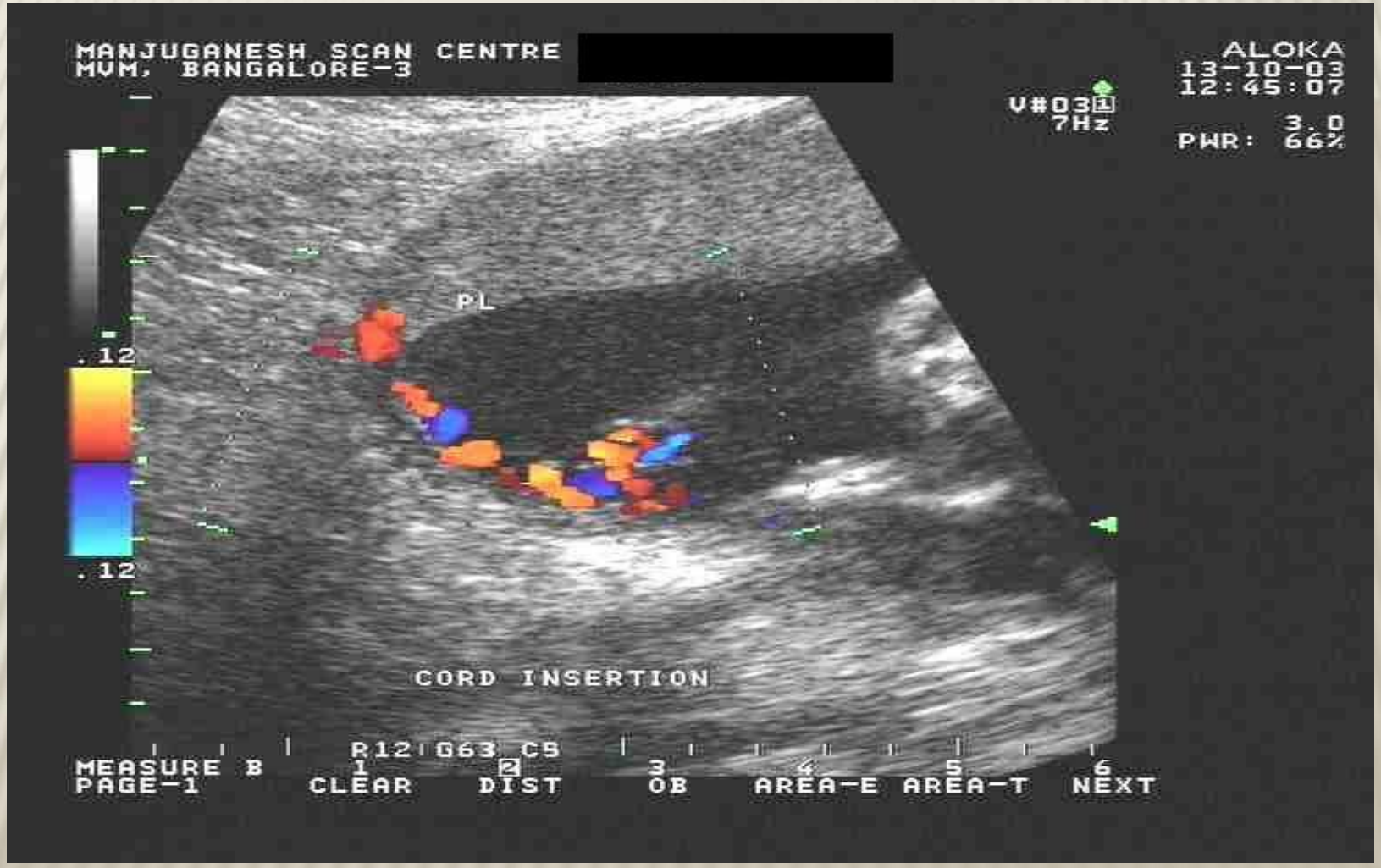
-low false negative 0.8/1000

-high false positives ~60%

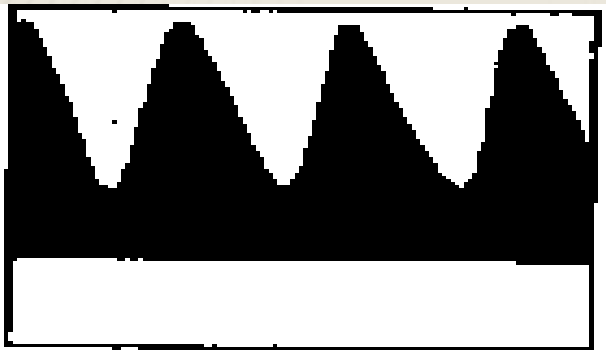
DOPPLER VELOCIMETRY

- Measurement of blood flow velocities in maternal & fetal vessels
- Reflect fetoplacental circulation
- Doppler indices from UA, Uterine A & MCA
- Doppler studies is mostly valuable IUGR
- In IUGR absent or reversed EDF (end diastolic flow) associated with fetal hypoxia

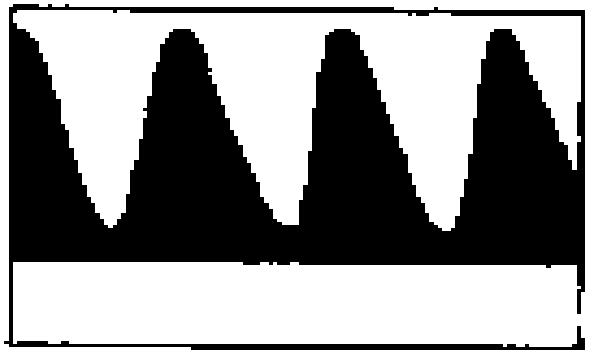
UMBILICAL ARTERY WAVEFORM



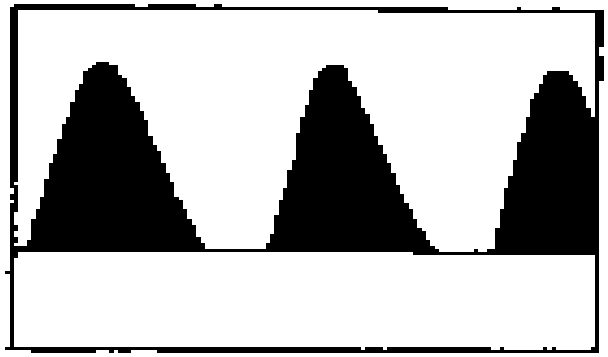
UMBILICAL ARTERY DOPPLER



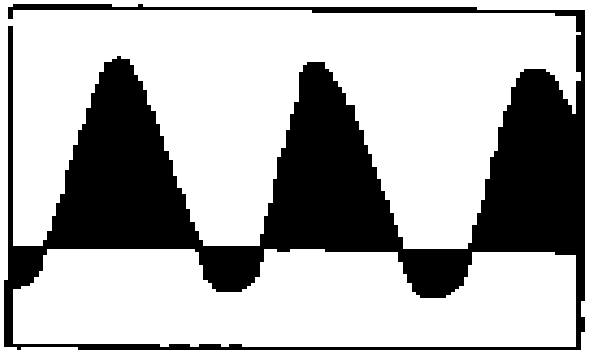
Normal pregnancy



Reduced end diastolic velocity



Absent end diastolic velocity



Reversed end diastolic velocity


Umbilical Cord Doppler

Antenatal testing methodologies

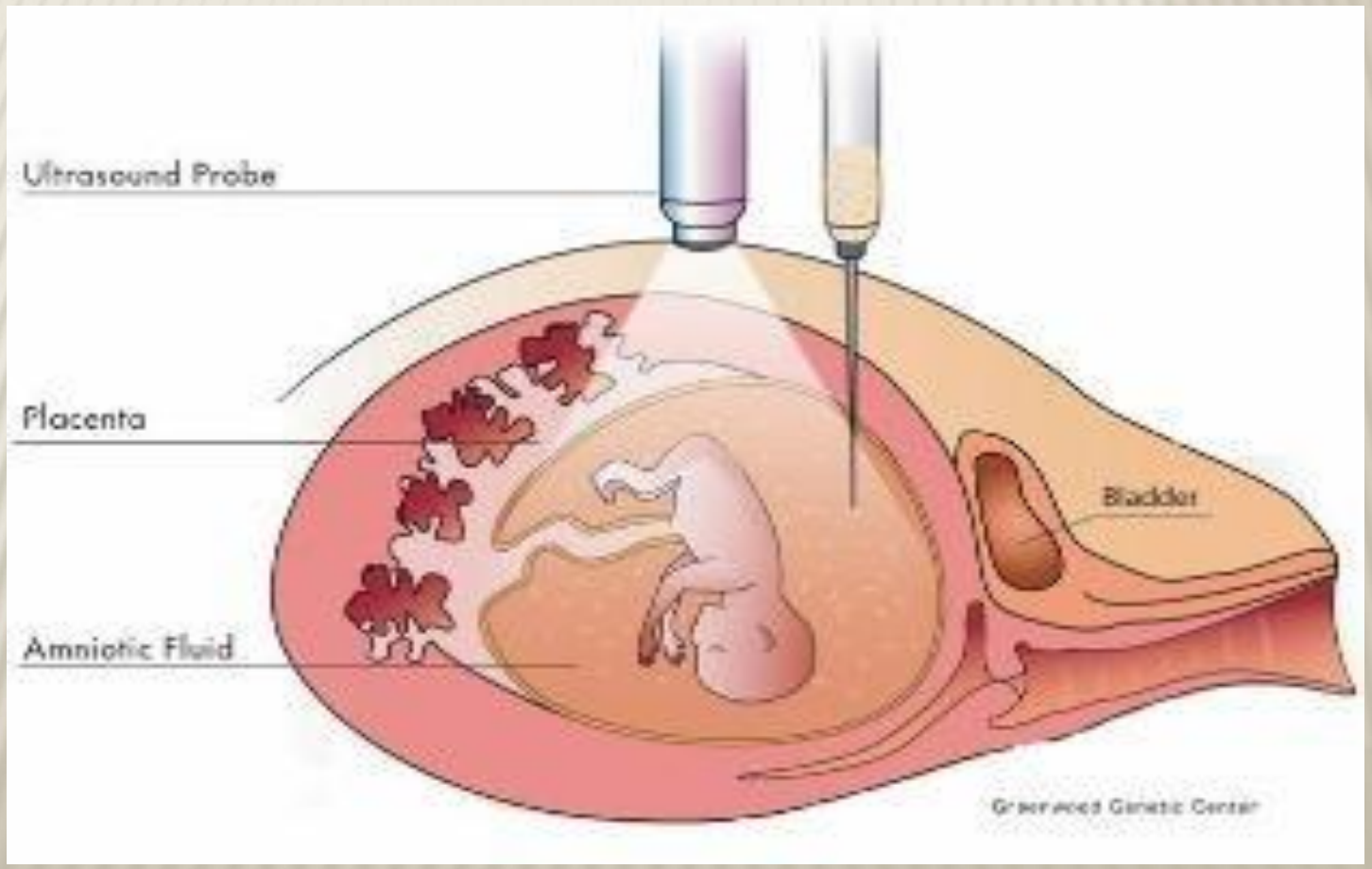
Name	Components	Results/scoring	False negative	False positive	References
Contraction stress test (oxytocin challenge test)	Continuous FHR monitoring At least 3 contractions of ≥40s duration within 10 min	**Negative:** no late or significant variable decelerations **Positive:** late decelerations following ≥50 percent of contractions, even if there are <3 contractions in 10 min **Equivocal - suspicious:** intermittent late decelerations or significant variable decelerations **Equivocal - hyperstimulatory:** decelerations with contractions occurring more frequently than q 2 min. or lasting >90s **Unsatisfactory:** <3 contractions in 10 min. or uninterpretable FHR tracing	0.04 percent	35-65 percent	[1,2]
Nonstress Test	Continuous FHR monitoring FHR accelerations: ≥32w: reaching 15 bpm above baseline and lasting ≥15s	**Reactive:** ≥2 accelerations within 20 min (may be extended to 40 min) **Nonreactive:** <2 accelerations in 40 min	0.2-0.65 percent	55-90 percent	[3-8]
Biophysical profile	Presence or absence of 5 components within 30 min: • Reactive NST • ≥1 episode of fetal breathing movements lasting ≥30s • ≥3 discrete body or limb movements • ≥1 episode of extremity extension with return to flexion or opening or closing of a hand • Maximum vertical AF pocket >2 cm or AFI >5 cm	Each component present is assigned score of 2 points; maximum score is 10/10 • **Normal:** ≥8/10 or 8/8 excluding NST • **Equivocal:** 6/10 • **Abnormal:** ≤4/10	0.07-0.08 percent	40-50 percent	[9-11]
Modified biophysical profile	NST AFI	**Normal:** Reactive NST *and* AFI >5 cm **Abnormal:** Nonreactive NST *and/or* AFI ≤5 cm	0.08 percent	60 percent	[12-15]

s=seconds; NST=nonstress test; AFI=amniotic fluid index; FHR=fetal heart rate; w=weeks

1. Freeman, RK, Anderson, G, Dorchester, W. A prospective multi-institutional study of antepartum fetal heart rate monitoring. II. Contraction stress test versus nonstress test for primary surveillance. Am J Obstet Gynecol 1982; 143:778.
2. Lagrew, DC Jr. The contraction stress test. Clin Obstet Gynecol 1995; 38:11.
3. Platt, LD, Walla, CA, Paul, RH, Trujillo, ME, Loesser, CV, Jacobs, ND, et al. A prospective trial of the fetal biophysical profile versus the nonstress test in the management of high-risk pregnancies. Am J Obstet Gynecol 1985; 153:624.
4. Lavery, JP. Nonstress fetal heart rate testing. Clin Obstet Gynecol 1982; 25:689.

INVASIVE FETAL ASSESSMENT

- Amniocentesis



AMNIOCENTESIS

- Obtaining a sample of amniotic flui during pregnancy.
- Usullay done after 15w (can be done after 11w)
- Indication

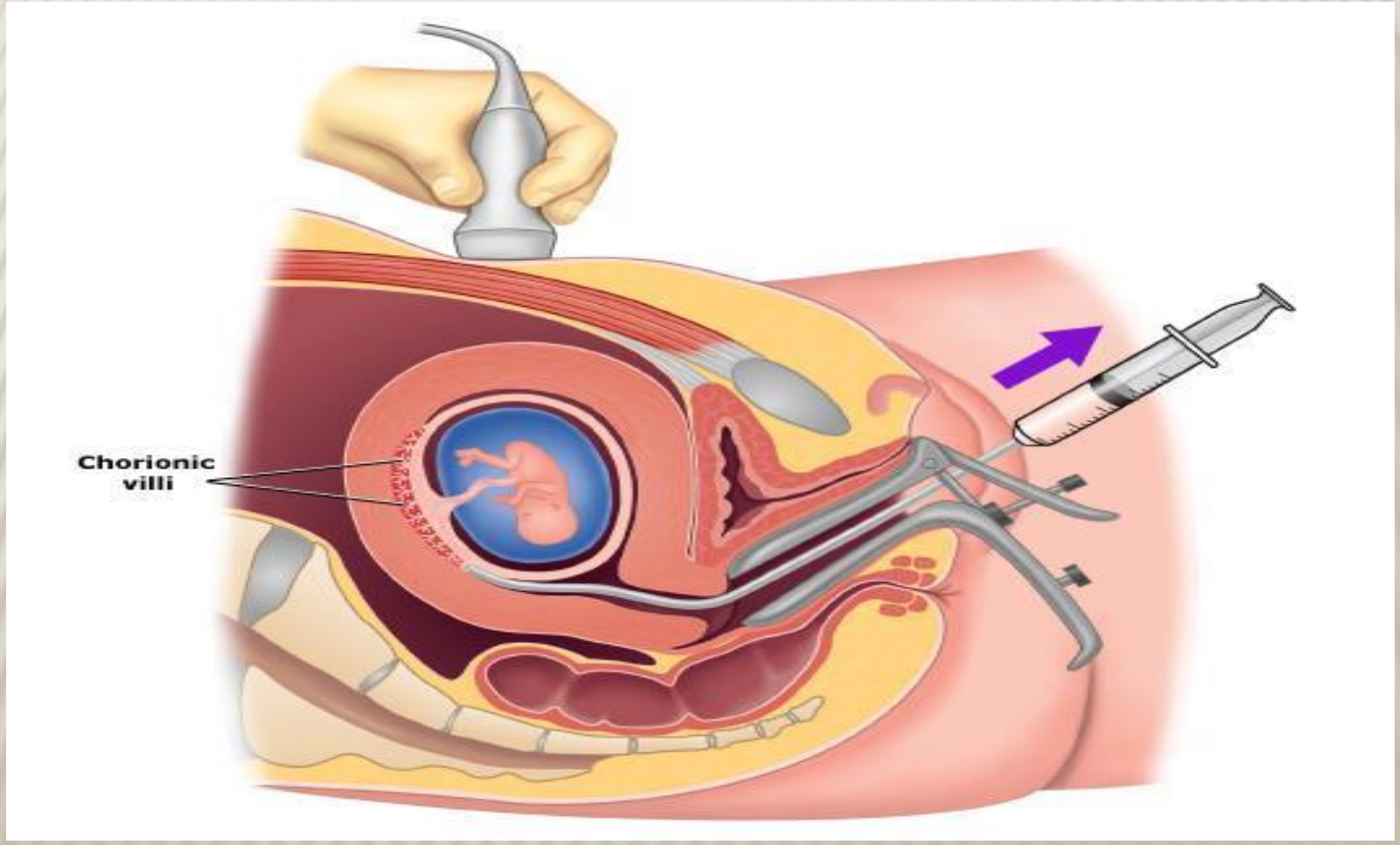
  -genitic (karyotype)

  -billirubine level (RH-isimunisation)

  -fetal lung maturity (L/S)

  -therputic in polyhydranios
- *Risks: ROM ~1%, abortion 0.5%, infection 1/1000*

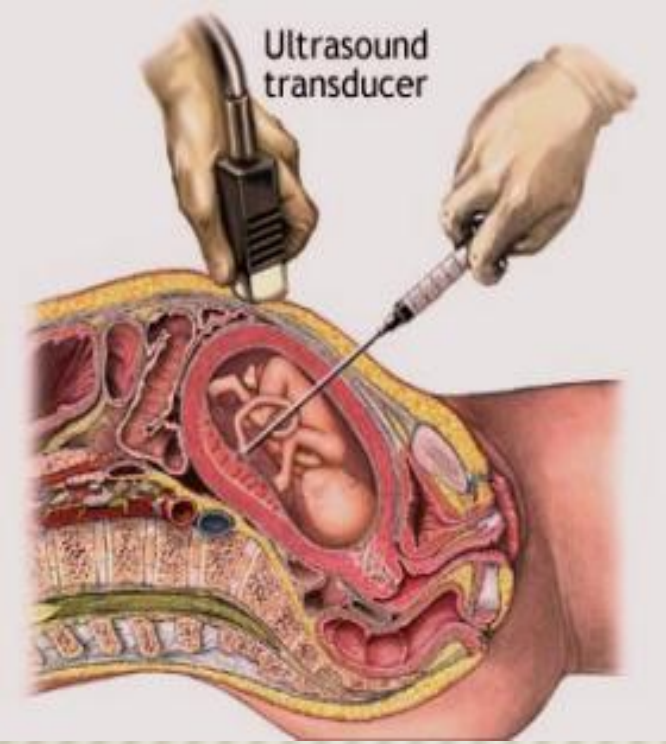
CVS chorionic villus sampling



CVS CHORIONIC VILLUS SAMPLING

- Usually done after 10w
- It is the procedure of choice for first trimester prenatal diagnosis of genetic disorders
- Complication: fetal loss (**0.7 percent within 14 days of a TA CVS procedure and 1.3 percent within 30 days),** Procedure-induced limb defects
- Second trimester amniocentesis is associated with the lowest risk of pregnancy loss; chorionic villus samplings safer than early (ie, before 15 weeks) amniocentesis.

CORDOCENTESIS



CORDOCENTESIS

- Indication: - rapid karyotyping
  -diagnosis of inherited disorders
  -fetal HB assessment
  -fetal plt level
  -fetal blood transfusion

- Complication: bleeding, bradycardia, infection....

Thanks & good luck