Prenatal Diagnostic Tests- Maternal (OB) Nursing

Ultrasound

Allows observer to detect fetal heartbeat, fetal breathing activity, and fetal body movement

3-D images can be captured for greater detail

Transvaginal ultrasound during the first trimester

- Gestational age can be configured by measuring the crown-rump length of the embryo

Transabdominal ultrasound during the second and third trimester

- Fetal anatomy is examined to identify any defects

Alpha-fetoprotein screening

Abnormal levels of AFP are associated with serious fetal anomalies

It is a *screening*; therefore additional testing will need to be done to determine the issue

Causes of increased AFP include

- Trisomy 21 (Down Syndrome)
- Anencephaly
- Spina bifida

Offered between 16-18 weeks gestation

Requires a sample of maternal blood

Chorionic Villus Sampling (CVS)

Used to diagnose fetal chromosomal, metabolic, or DNA abnormalities

Performed between 10-13 weeks

Transcervical-

- Flexible catheter is inserted through the cervix and a sample of chorionic villi is aspirated

Transabdominal-

- Needled is inserted through the abdominal and uterine wall to obtain the sample

Patient should rest for several hours after the procedure

Patient should monitor for heavy bleeding or passage of amniotic fluid, tissue, or clots- could indicate miscarriage

Cervical or vaginal infection is a contraindication

Rh sensitization can occur. All unsensitized Rh negative women should be given RhoGAM after the procedure.

Amniocentesis

Aspiration of amniotic fluid from the amniotic sac

Can be performed in the second and third trimester

Second trimester

- Used to examine fetal cells present in amniotic fluid to identify chromosomal or biochemical abnormalities
- Used to diagnose amnionitis

Third trimester

- Used to determine fetal lung maturity and fetal hemolytic disease
- Lecithin/sphingomyelin (L/S) ratio is used to estimate fetal lung maturity
    - L/S ration greater than 2:1 indicates fetal lung maturity
- Phosphatidylglycerol (PG) and phosphatidylinositol (PI) are also tested to ensure lung maturity

Procedure:

- Patient is positioned in a supine position with a wedge under one buttock.
- Ultrasound used to locate fetus and placenta
- Local anesthetic
- 3-4-inch, 20-21 gauge needle inserted
- Approximately 20 mL is aspirated (first 1-2 mL is discarded to avoid contamination)
- Electronic fetal monitoring for 30-60 minutes after
- Patient can resume normal activities after 24 hours
- RhoGAM for unsensitized Rh negative women

Small risk for infection and fetal death (spontaneous abortion)

Percutaneous umbilical blood sampling (PUBS)

Aspiration of fetal blood from the umbilical cord needed for karyotype

Ultrasound to identify fetus, placenta, and umbilical cord

Needle is inserted through abdomen into uterus and sample is taken

Risks include

- Fetal death
- Infection
- Cord laceration
- Preterm labor
- Premature rupture of membranes

RhoGAM given to unsensitized Rh negative women

Antepartum fetal surveillance

Nonstress Test

Identifies whether an increase in fetal heart rate occurs when the fetus moves. This activity indicates adequate oxygenation

Electronic fetal monitoring is applied for the test

Results are either reactive (reassuring) or nonreactive (nonreassuring)

Reactive (reassuring)	Two fetal heart rate accelerations within a 20-minute period At least 15 beats above baseline
Nonreactive (nonreassuring)	Tracing does not demonstrate characteristics for reactive tracing within 40 minutes or longer

Fetal sleep cycles are a common reason for a lack of fetal movement

Contraction Stress Test

Oxytocin challenge test (OCT)

May be done if NST is nonreactive

Nipple stimulation can be used to stimulate oxytocin release

Lace decelerations and loss of variability may indicate fetal hypoxia and fetal acidosis

Contraindications:

- Preterm labor
- Preterm membrane rupture
- Placenta previa
- History of uterine surgery

Procedure:

- External electronic fetal monitoring is applied
- 3 contractions of 40 seconds each within a 10-minute period are needed
- Nipple stimulation of IV low-dose oxytocin can be used

Results:

- Negative (reassuring): no late or variable decelerations
- Positive (nonreassuring): late decelerations follow 50% or more of contractions
- Equivocal-suspicious: intermittent late or significant variable decelerations
- Equivocal-hyperstimulation: fetal heart rate decelerations occur in the presence of excessive contractions
- Unsatisfactory: fewer than 3 contractions within 10 minutes or tracing cannot be interpreted

Biophysical Profile

5 parameters are assessed

- Nonstress test
- Fetal breathing movements
- Fetal tone
- Amniotic fluid volume
- Gross fetal movements

A scoring technique is used to quantify the data

Each parameter contributes 0 or 2 points out of 10 total points

0-worst; 10-perfect

8/10-10/10= reassuring

4/10 or less= nonreassuring

	2 points- present	0 points- absent
Nonstress test	Reactive	Nonreactive
Fetal breathing movement	≥1 episode of rhythmic fetal breathing movement of 30 seconds or more within 30 minutes	Absent fetal breathing movements
Gross body movements	≥3 trunk movements within 30 minutes	≤2 trunk movements in 30 minutes
Fetal tone	≥1 episode of fetal extremity extension with return to flexion; opening and closing hand within 30 minutes	Absence of flexion; extension with return to partial flexion
Amniotic fluid volume	At least one pocket of fluid measuring 2 cm in two planes perpendicular to each other	Amniotic fluid does not meet criteria