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Modern Methods of Assessing the Condition of the Mother and Fetus during Pregnancy

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Annotation: Your doctor may recommend a variety of screenings, tests, and imaging techniques during pregnancy. These tests are designed to provide information about your baby's health and help optimize your child's prenatal care and development.

Genetic testing helps identify the potential for certain genetic disorders before birth.

First trimester screening is a combination of fetal ultrasound and maternal blood testing. This screening process helps determine the risk of the fetus having certain birth defects.

Second-trimester prenatal screening may include several blood tests called multiple markers. These signs provide information about the risk of having a baby with certain genetic diseases or birth defects.

You can have an ultrasound at different times of your pregnancy to check the growth of the fetus, estimate the due date and look for any structural abnormalities in the baby.

Additional testing during pregnancy may include amniocentesis, chorionic villus sampling (CVS), fetal monitoring, glucose testing, and group B streptococcal.

Genetic screening

Many genetic abnormalities can be detected before birth. Your doctor or midwife may recommend genetic testing during pregnancy if you or your partner have a family history of genetic disorders. If you have a fetus or baby with a genetic abnormality, you may have genetic

testing.

Keywords: Cystic fibrosis, Duchenne muscular dystrophy, Hemophilia A, Polycystic kidney disease, Sickle cell disease, Tay-Sachs disease, Thalassemia.

The following screening methods are available during pregnancy:

a) Alpha-fetoprotein (AFP) test or multiple marker test

b) Amniocentesis

c) Chorionic villus sampling

d) Cell-free fetal DNA testing

e) Percutaneous umbilical cord blood sampling (taking a small sample of fetal blood from the umbilical cord)

f) Ultrasound examination

The first trimester examination includes:

a) Ultrasound to determine the transparency of the neck of the fetus. A nuchal translucency screening uses ultrasound to check for increased fluid or thickening of the back of the cervix.

b) Ultrasound to determine the nasal bone of the fetus. Some babies with certain chromosomal abnormalities, such as Down syndrome, may not have visible nasal bones. This screening is performed using ultrasound between 11 and 13 weeks of pregnancy.

c) Mother's serum (blood) tests. These blood tests measure two substances found in the blood of all pregnant women:

d) Pregnancy-associated plasma protein A. A protein produced by the placenta early in pregnancy. Abnormal levels are associated with an increased risk of chromosomal abnormalities.

e) Human chorionic gonadotropin. A hormone produced by the placenta at the beginning of pregnancy. Abnormal levels are associated with an increased risk of chromosomal abnormalities.

f) When used together as first-trimester screening tests, nuchal translucency screening and maternal blood tests are more capable of detecting birth defects such as Down syndrome (trisomy 21) and trisomy 18 in the fetus.

g) If the results of the first trimester screening tests are abnormal, genetic counseling is recommended. Additional tests such as chorionic villus sampling, amniocentesis, cell-free fetal DNA, or other ultrasounds may be required to make an accurate diagnosis.

Second Trimester Prenatal Screening Tests

Second-trimester prenatal screening may include several blood tests called multiple markers. These signs provide information about the risk of having a child with certain genetic conditions or birth defects. Screening is usually done by taking a blood sample between 15 and 20 weeks of pregnancy (16 to 18 weeks is ideal). Many symptoms include:

AFP screening. This blood test, also called maternal serum AFP, measures the level of AFP in your blood during pregnancy. AFP is a protein normally produced by the fetal liver and is found in the fluid surrounding the fetus (amniotic fluid). It passes through the placenta and enters the blood. Abnormal levels of AFP may indicate:

a) Incorrectly calculated period, because levels fluctuate during pregnancy
b) Fetal abdominal wall defects
c) Down syndrome or other chromosomal abnormalities
d) Open neural tube defects such as spina bifida
e) Twins (multiple fetuses produce protein)
f) **Estriol**. This is a hormone produced by the placenta. It can be measured in the mother's blood or urine, which is used to determine the health of the fetus.
g) **Inhibin**. This is a hormone produced by the placenta.
h) **Human chorionic gonadotropin.** This is also a hormone produced by the placenta.

Abnormal test results for AFP and other markers may indicate the need for further investigation. Ultrasound is used to confirm pregnancy milestones and check for defects in the fetal spine and other parts of the body. Amniocentesis may be necessary to make the correct diagnosis.

Because multiple marker screening is not diagnostic, it is not 100 percent accurate. This will help determine who in the population should be offered additional tests during pregnancy. False positive results can indicate a problem when the fetus is actually healthy. On the other hand, false-negative results indicate a normal result when there is a problem with the health of the fetus.

When you perform first and second trimester screening tests, the ability of the tests to detect an abnormality is greater than using only one screening on its own. Most cases of Down syndrome can be detected using first- and second-trimester screenings.

Ultrasound

The technician shows the fetus to the mother and father while performing the ultrasound examination.

Ultrasound is a diagnostic method that uses high-frequency sound waves to create images of internal organs. Sometimes an ultrasound scan is performed during pregnancy to check the normal growth of the fetus and to check the due date.

When is ultrasound done during pregnancy?

Ultrasound examination can be performed at different times of pregnancy for various reasons:

a) First trimester
b) Set the payment date (this is the most accurate way to determine the term)
c) Determining the number of fetuses and determining placental structures
d) To diagnose an ectopic pregnancy or miscarriage
e) Examination of the anatomy of the uterus and other pelvic organs
f) To detect fetal abnormalities (in some cases)
g) Mid-trimester (also called the 18-20 week scan)
h) To confirm the due date (the term set in the first trimester is rarely changed)
i) Determination of the number of fetuses and examination of the structures of the placenta
j) Help with prenatal tests, such as amniocentesis
k) Examination of the anatomy of the fetus for anomalies
l) To check the amount of amniotic fluid
m) Check blood flow patterns

n) Monitoring the behavior and activity of the fetus

o) To measure the length of the cervix

p) To monitor the growth of the fetus

q) Third trimester

r) To monitor the growth of the fetus

s) To check the amount of amniotic fluid

t) Conduct a biophysical profile test

u) To determine the condition of the fetus

v) To evaluate the placenta

How is an ultrasound examination performed?

Two types of ultrasound can be performed during pregnancy:

Ultrasound examination of the abdomen . In the ultrasound examination of the abdomen, gel is applied to the abdomen. An ultrasound transducer slides over gel in the abdomen to create an image.

Transvaginal ultrasound. In a transvaginal ultrasound, a smaller ultrasound transducer is inserted into your vagina and rests against the back of your vagina to create an image. Transvaginal ultrasound produces a more accurate image than abdominal ultrasound and is often used in early pregnancy.

What are the methods of ultrasound examination?

There are several types of ultrasound examination. As the most common type, 2-D ultrasound provides a flat image of one side of the baby.

If more information is needed, a 3D ultrasound can be performed. This technique, which provides a 3-dimensional image, requires a special machine and special training. 3D imaging allows the healthcare provider to see the width, height, and depth of the images, which can be helpful during diagnosis. 3D images can also be captured and saved for later review.

The newest technology is 4-D ultrasound, which allows the doctor to see the movements of the unborn baby in real time. With 4-D imaging, the three-dimensional image is constantly updated, providing a "live action" appearance. These images often have a golden tint, which helps show shadows and highlights.

Ultrasound images may be captured in photographs or on video to document the findings.

What are the risks and benefits of ultrasound?

There is no risk of fetal ultrasound other than mild discomfort due to the pressure of the transducer on your abdomen or vagina. No radiation is used during the procedure.

Transvaginal ultrasound requires covering the ultrasound transducer under a plastic or latex mask, which can cause a reaction in women with latex allergies.

Ultrasound examination is constantly improved and improved. As with any test, the results may not be completely accurate. However, ultrasound can provide parents and health care providers with valuable information that can help them manage and care for their pregnancy and baby. In addition, ultrasound examination gives parents a unique opportunity to see the baby before birth, helps to bond with them and establish early relationships.

Sometimes, fetal ultrasound is offered in a non-medical setting to provide memory images or videos for parents. Although ultrasound itself is considered safe, untrained personnel may miss abnormalities or give false assurances to parents about the baby's well-being. It is best to undergo

an ultrasound examination by qualified medical personnel who can correctly interpret the results. If you have any questions, talk to your doctor or midwife.

Amniocentesis

Amniocentesis involves taking a small sample of the amniotic fluid that surrounds the fetus. It is used to diagnose chromosomal disorders and open neural tube defects such as spina bifida. Depending on your family history and the availability of laboratory testing at the time of the procedure, testing for other genetic defects and diseases is available.

Amniocentesis is usually offered to women at high risk for chromosomal abnormalities between 15 and 20 weeks of pregnancy. Candidates include women over 35 years of age at the time of delivery or women who have undergone maternal serum screening.

How is amniocentesis performed?

Amniocentesis involves inserting a long, thin needle through the abdomen into the amniotic sac to obtain a small sample of amniotic fluid. Amniotic fluid contains cells shed by the fetus, which contain genetic information. Although the specific details of each procedure may vary, a typical amniocentesis is performed following this procedure:

Your abdomen will be cleaned with an antiseptic.

Your doctor may or may not give you a local anesthetic to numb the skin.

Your doctor will use ultrasound technology to guide a hollow needle into the amniotic sac. He takes a small sample of the fluid for laboratory analysis.

You may experience some cramping during or after amniocentesis. Strenuous activity should be avoided for 24 hours after the procedure.

Women who are pregnant with twins or other high-order multiples should take a sample from each amniotic sac to study each baby. Depending on the condition of the baby and the placenta, the amount of fluid and the woman's anatomy, sometimes amniocentesis is not possible. The fluid is then sent to a genetics lab so the cells can be grown and analyzed. AFP is also measured to rule out a patent neural tube defect. Results are usually 10 days to two weeks, depending on the lab.

CVS is a prenatal test that involves sampling a piece of placental tissue. This tissue contains the same genetic material as the fetus and can be tested for chromosomal abnormalities and other genetic problems. Testing is available for other genetic defects and diseases, depending on your family history and the availability of laboratory testing at the time of the procedure. Unlike amniocentesis, CVS does not report open neural tube defects. Therefore, women who undergo CVS should also have a follow-up blood test between 16 and 18 weeks of pregnancy to check for these defects.

How is CVS implemented?

CVS may be offered to women who are at high risk for chromosomal abnormalities or who have a genetic defect that can be tested from placental tissue. CVS is usually performed between 10 and 13 weeks of pregnancy. Although the exact methods may vary, the procedure involves the following steps:

The doctor will insert a small tube (catheter) through your vagina and into your cervix.

Using ultrasound technology, the doctor guides the catheter to a place near the placenta.

Your doctor will remove some tissue using a syringe at the other end of the catheter.

Your doctor may also choose to perform a transabdominal CVS, which involves inserting a needle through the abdomen and into the uterus to sample placental cells. You may experience some cramping during and after any type of CVS procedure. Tissue samples are sent to a genetics laboratory for growth and analysis. Results are usually 10 days to two weeks, depending on the

lab.

What if CVS is not possible?

Women with twins or other high multiples should usually have samples taken from each placenta. However, due to the complexity of the procedure and the location of the placentas, CVS is not always performed or successfully reproduced.

Women who are not candidates for CVS or who do not have clear results from the procedure may require further amniocentesis. An active vaginal infection such as herpes or gonorrhea prohibits the procedure. In other cases, the doctor may take a sample that does not have enough tissue to culture in the laboratory, which may produce incomplete or inconclusive results.

Fetal monitoring

During late pregnancy and labor, your doctor may want to monitor the fetus's heart rate and other functions. Fetal heart rate monitoring is a method of checking fetal heart rate and rhythm. The average heart rate of the fetus is 120 to 160 per minute. This indicator can change when the fetus responds to the conditions in the womb. An abnormal fetal heartbeat or pattern may indicate that the fetus is not getting enough oxygen or other problems. An abnormal shape may also mean that an emergency caesarean section is needed.

How is fetal monitoring done?

Using a fetoscope (a type of stethoscope) to listen to the fetal heartbeat is the most basic way to monitor the fetal heartbeat. Another type of monitoring is done with a handheld Doppler device. This is often used during prenatal visits to calculate the fetal heart rate. Continuous electronic fetal monitoring is often used during labor. Although the specific details of each procedure may vary, standard electronic fetal monitoring follows this process:

A gel is applied to your abdomen to act as a medium for the ultrasound transducer.

An ultrasound transducer is attached to the abdomen with straps, so it can transmit the fetal heartbeat to a recorder. The heartbeat of the fetus is displayed on the screen and printed on a special paper.

During contractions, an external tocodynamometer (a monitoring device attached to the upper part of the uterus with a belt) can record the contraction pattern.

When is internal fetal monitoring necessary?

Sometimes internal fetal monitoring is required to get a more accurate fetal heart rate reading. Your sac of water (amniotic fluid) should have broken and your cervix should be partially dilated. Internal fetal monitoring involves inserting an electrode through the dilated cervix and attaching the electrode to the fetal scalp.

a) Glucose test

b) A glucose test is used to measure the level of sugar in the blood.

c) Glucose testing is usually done between 24 and 28 weeks of pregnancy. Abnormal glucose levels may indicate gestational diabetes.

What is included in a glucose test?

The first one-hour test is a glucose test. If the results are abnormal, a glucose tolerance test should be performed.

How is the glucose tolerance test performed?

You may only be asked to drink water on the day of the glucose tolerance test. Although the specific details of each procedure may vary, a typical glucose tolerance test includes the following steps:

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