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The Role of Cardiotocography in Obstetric Practice: Maternal and Fetal Safety

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Annotation: Cardiotocography (CTG) is a modern method of assessing the state of the fetus by the nature of the heartbeat. CTG is performed only in the third trimester of pregnancy, more precisely after the 32nd week, because only after this period does the relationship between the contraction of the fetal heart and its functional state appear.

Cardiotography is prescribed for timely diagnosis of fetal diseases, which allows the obstetrician-gynecologist to prescribe the correct treatment, evaluate its effectiveness and, if necessary, admit the pregnant woman to the maternity hospital, where the optimal time and method are determined. delivery is determined based on the results of CTG, ultrasound and Doppler measurements.

Keywords: Indications for CTG during pregnancy, Preeclampsia in the second half of pregnancy; Maternal diseases (hypertension, diabetes, anemia, etc.).

rhesus conflict; Pregnancy after pregnancy; Delay in fetal development; Oligohydramnios or polyhydramnios;

Violation of uteroplacental or fetoplacental blood flow (diagnosis of blood flow in the maternal-placental-fetal system is carried out using Doppler ultrasound - ultrasound examination of blood flow).

Cardiotocography is based on recording the heartbeat of the fetus using an ultrasound sensor. During the study, changes in fetal heart rate are recorded in the form of a graph called a cardiotocogram.

To conduct the study, the ultrasound sensor is attached to the pregnant woman's abdomen at the best audible point of the fetal heartbeat using a special tape. Since the fetus can lie in different

ways, the sensor is attached to pregnant women at different points of the front abdominal wall. In the case of twins, two sensors are installed at the same time, or one fetus is checked alternately, then the other. Ultrasound waves emitted by the sensor are absolutely safe for the mother and the unborn baby. A special transparent gel is applied to the surface of the sensor, which improves the contact between the sensor and the skin of the front abdominal wall of the pregnant woman and the permeability of ultrasound waves.

During the recording of the cardiotocogram, the heartbeat of the fetus is heard with the naked ear, which allows medical personnel and the expectant mother to monitor the accuracy of the study. If during the study the position of the fetus changes and the characteristic sound of the heartbeat disappears, the position of the sensor changes and the study continues.

CTG is performed with the pregnant woman lying on her side or in a semi-sitting position so that the enlarged uterus does not compress the inferior vena cava (a large vessel that carries venous blood from the lower half of the body to the heart). Compression of the inferior vena cava can cause a worsening of the condition of a pregnant woman, a decrease in blood pressure and a change in pulse.

Research takes a lot of time: from 40 minutes to 1.5 hours. This period is related to the periods of sleep and wakefulness of the fetus. The minimum duration of the study is 40 minutes, if the fetus falls asleep in the first 40 minutes of the study and the indicators of its condition deviate from the norm, the study is automatically extended.

If the expectant mother is tired of lying on one side, feels unwell, or the recording of the fetal heartbeat in the mother's stomach becomes unclear, then the research can be stopped for a short time by stopping the device. If the fetus falls asleep during the examination, you can "wake" it by patting its belly, talking to it, or eating something sweet, such as candy.

Attention! CTG results cannot replace a doctor's examination and other examination methods, for example, Doppler and ultrasound examination.

CTG results are interpreted by an obstetrician-gynecologist or a special program installed on the CTG device. The automated CTG assessment system allows you to accurately determine the position of the fetus.

When automatically assessing the position of the fetus, the device calculates the Fetal Position Index (FSI).

PSP - less than 1.0 indicates the normal condition of the fetus, but if the PSP is from 0.7 to 1.0, the study should be repeated after 7-10 days.

PSP from 1.01 to 2.0 - shows early signs of fetal condition disorder, which requires treatment and control of CTG after 5-7 days.

PSP from 2.01 to 3.0 indicates a serious condition of the fetus, requiring hospitalization in the maternity ward.

PSP more than 3.0 - reports a severe condition of the fetus that requires urgent hospitalization and delivery.

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 connect 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 available in 10 days to two weeks depending on the laboratory.

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 collect a sample of 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 available in 10 days to two weeks depending on the laboratory.

What if CVS is not possible?

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

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.

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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.

Glucose test

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

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

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