

Electronic Fetal Heart Monitoring

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Test Overview

Electronic fetal heart monitoring is done during pregnancy, labour, and delivery to keep track of the heart rate of your baby (fetus) and the strength and duration of the contractions of your uterus. Your baby's heart rate is a good way to tell whether your baby is doing well or may have some problems.

Two types of monitoring—external and internal—can be done.

External monitoring

You may have external monitoring (See figure 1 in appendix) at different times during your pregnancy, or it may be done during labour.

External monitoring can be done by listening to your baby's heartbeat with a special stethoscope. More often, external monitoring is done using two flat devices (sensors) held in place with elastic belts on your belly. One sensor uses reflected sound waves (ultrasound) to keep track of your baby's heart rate. The other sensor measures the duration of your contractions. The sensors are connected to a machine that records the information. Your baby's heartbeat may be heard as a beeping sound or printed out on a chart. The frequency and duration of your uterine contractions are usually printed out on a chart.

External monitoring is used for a non-stress test, which records your baby's heart rate while your baby is moving and not moving. A non-stress test may be combined with a fetal ultrasound to evaluate the amount of your amniotic fluid.

External monitoring is also done for a contraction stress test, which records changes in your baby's heart rate when you have uterine contractions. It may be done to check on your baby's health if your baby does not move enough during a non-stress test. It may help predict whether your baby can handle the stress of labour and vaginal delivery.

Sometimes external monitoring is done remotely (called telemetry), without your needing to be connected by wires to a machine. At some hospitals, the sensors can send the information about your baby's heart rate and your uterine contractions to a remote monitor, usually at a nurse's station. Remote monitoring allows you to walk around freely.

Internal monitoring

Internal monitoring can be done only after your cervix has dilated to at least 2 centimetres (cm) and your amniotic sac has ruptured. Once started, internal monitoring is done continuously.

For internal monitoring, a sensor is attached to your thigh with a strap. A thin wire (electrode) from the sensor is inserted through your vagina and cervix into your uterus. The electrode is then attached to your baby's scalp. Your baby's heartbeat may be heard as a beeping sound or printed out on a chart. Internal monitoring does not use reflected sound waves (ultrasound) for monitoring.

A small tube that measures uterine contractions may be placed in your uterus next to your baby. The strength and timing of your uterine contractions is usually printed out on a chart.

Internal monitoring is more accurate than external monitoring for keeping track of your baby's heart rate and your contractions.

Why It Is Done

External fetal heart monitoring is done to:

- Keep track of your baby's heart rate.
- Measure how often you have a contraction and how long your contractions last during labour and delivery.
- Find out whether you are having preterm labour.
- Check on your baby's health if problems are suspected. External fetal heart monitoring will be done during a non-stress test to check your baby's heart rate while at rest and while moving. If your baby does not move during this test, more testing will be needed.
- Check on your placenta to make sure that it is giving your baby enough oxygen. A contraction stress test that shows that your baby is not getting enough oxygen helps your doctor make decisions about the safest delivery method. If the test shows that your baby may be in danger, your doctor may recommend starting (inducing) labour early or may talk to you about doing a caesarean section (C-section).
- Check your baby's health if your baby has not been growing normally (delayed fetal growth) or if you have diabetes, high blood pressure (hypertension), or are over 41 weeks pregnant.

Internal fetal heart monitoring is done to:

- Find out if the stress of labour is threatening your baby's health.
 - Measure the strength and duration of your labour contractions.
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How To Prepare

You may be asked to eat a meal shortly before having a non-stress test, because digesting food often increases the movement of your baby.

If you are having a contraction stress test, you may be asked to not eat or drink for 4 to 8 hours before the test.

If you smoke, you will be asked to stop smoking for two hours before the external monitoring test because smoking decreases your baby's activity.

How It Is Done

External monitoring can be done any time after 20 weeks of pregnancy. Internal monitoring is used only when you are in labour and your amniotic sac has broken. If internal monitoring is needed and your amniotic sac has not broken, your doctor may break the sac to begin the test. Sometimes a combination of internal and external monitoring is done by measuring your baby's heart rate with an internal sensor and measuring your contractions with an external sensor.

External monitoring

For external monitoring, you will usually lie on a table on your back or left side. Two belts with sensors attached will be placed around your belly. One belt holds the sensor that keeps track of your baby's heart rate, while the other measures the timing and strength of your uterine contractions. Gel may be applied to provide good contact between the heart rate sensors and your skin. The sensors are attached with wires to a recording device that can indicate or print out a record of your baby's heart rate as well as the strength and duration of uterine contractions. The position of the heart rate monitor may be changed periodically to adjust to the movement of your baby.

For a non-stress test, the sensors are placed on your belly. You may be asked to push a button on the machine every time your baby moves or you have a contraction. Your baby's heart rate is recorded and compared to the record of movement or your contractions. This test usually lasts about 30 minutes.

For a contraction stress test, the sensors are placed on your belly. After about 20 minutes of monitoring, uterine contractions are started (induced). To start contractions, you may be instructed to stimulate your nipples or you may be given a medication called oxytocin (such as Pitocin) in a vein (intravenous, or IV). If oxytocin is given, it will be increased gradually until you have 3 contractions in 10 minutes. Changes in your baby's heart rate in response to your contractions are measured.

Internal monitoring

For internal monitoring, you will usually lie on a table on your back or left side. A thin wire (electrode) will be guided through your vagina and cervix and attached to your baby's scalp. A small tube is also inserted through your vagina to connect a device that monitors the contractions inside your uterus. A belt is placed around your upper leg to keep the monitor in place. The electrode and the tube are attached with wires to a recording device that can indicate or print out a record of your baby's heart rate as well as the strength and duration of your uterine contractions.

How It Feels

Lying on your back (or side) while you are being monitored may be uncomfortable or painful if you are having labour contractions. The belts holding the monitors in place may feel tight.

You may be able to change positions or move around more during internal electronic fetal heart monitoring than during external monitoring.

Placing the internal monitor into your uterus may be mildly uncomfortable.

Risks

Studies show that electronic fetal monitoring may be linked to an increase in caesarean deliveries and in the use of a vacuum or forceps during delivery.¹

There is a slight risk of infection for your baby when internal monitoring is done.

Results

Electronic fetal heart monitoring is done during pregnancy, labour, and delivery to keep track of the heart rate of your baby (fetus) and the strength and duration of the contractions of your uterus. The results of electronic fetal heart monitoring are usually available immediately.

Electronic fetal monitoring	
Normal:	Your baby's heart rate is between 110 to 160 beats per minute.
	Your baby's heart rate increases (accelerates) when he or she moves and when your uterus contracts.
	Your baby's heart rate drops during a contraction but rapidly returns to normal after the contraction is over.
	Uterine contractions during labour are strong and regular.
Abnormal:	Your baby's heart rate is less than 110 beats per minute.
	Your baby's heart rate is more than 160 beats per minute.
	During a non-stress test, your baby's heart rate does not increase by 15 beats per minute or drops far below its baseline rate (deceleration) after he or she moves.

	During a contraction stress test, your baby's heart rate drops far below its baseline rate after each uterine contraction.
	Uterine contractions are weak or irregular during labour.

What Affects the Test

Reasons you may not be able to have the test or why the results may not be helpful include:

- Smoking cigarettes or using other tobacco products and drinking or eating large amounts of caffeine (such as from several cups of strong coffee), which can falsely raise your baby's heart rate.
 - Extra noises such as your heartbeat or your stomach rumbling.
 - Your baby is sleeping during a non-stress test.
 - Problems with the placement of the external monitoring device. These problems may include:
 - Your baby is moving a lot during the test.
 - You are pregnant with more than one baby, such as twins or triplets.
 - You are overweight.
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What To Think About

- Not everyone feels the same about fetal monitoring.
 - Some mothers think that fetal heart monitoring is not needed and interferes with the natural birthing process.
 - Other mothers think that fetal heart monitoring is reassuring. This may be true if they had problems with earlier pregnancies.
- Fetal monitoring can't predict every type of problem, such as birth defects. Normal fetal heart monitoring test results do not mean that your baby is healthy.
- Continuous monitoring during labour is more likely to be useful for high-risk pregnancies. Intermittent fetal heart monitoring during labour is as effective as continuous monitoring in low-risk pregnancies.
- If your baby appears to be having problems, sometimes a blood sample is taken from a small blood vessel (capillary) in his or her scalp. The blood sample can help determine if your baby is receiving enough oxygen.
- Your baby may move more if you eat or drink juice before having a non-stress test. This may make the test results more useful.
- Sometimes other methods (such as ringing a bell near the uterus) are used to cause changes in your baby's heart rate.
- External fetal heart monitoring is used during other tests of fetal health, such as a non-stress test, contraction stress test, and biophysical profile.

For more information, see the topics Contraction Stress Test and Biophysical Profile (BPP).

Related Information

- Biophysical Profile (BPP)
 - Fetal Ultrasound
 - Pregnancy
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References

Citations

1. American College of Obstetricians and Gynecologists (2009). Intrapartum fetal heart rate monitoring: Nomenclature, Interpretation, and General Management Principles. ACOG Practice Bulletin No. 106. Obstetrics and Gynecology, 114(1): 192–202.

Other Works Consulted

- American College of Obstetricians and Gynecologists (2009). Intrapartum fetal heart rate monitoring: Nomenclature, Interpretation, and General Management Principles. ACOG Practice Bulletin No. 106. Obstetrics and Gynecology, 114(1): 192–202.
 - Fischbach FT, Dunning MB III, eds. (2009). Manual of Laboratory and Diagnostic Tests, 8th ed. Philadelphia: Lippincott Williams and Wilkins.
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Credits for Electronic Fetal Heart Monitoring

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Appendix

Topic Images

Figure 1

External Fetal Heart Rate Monitoring

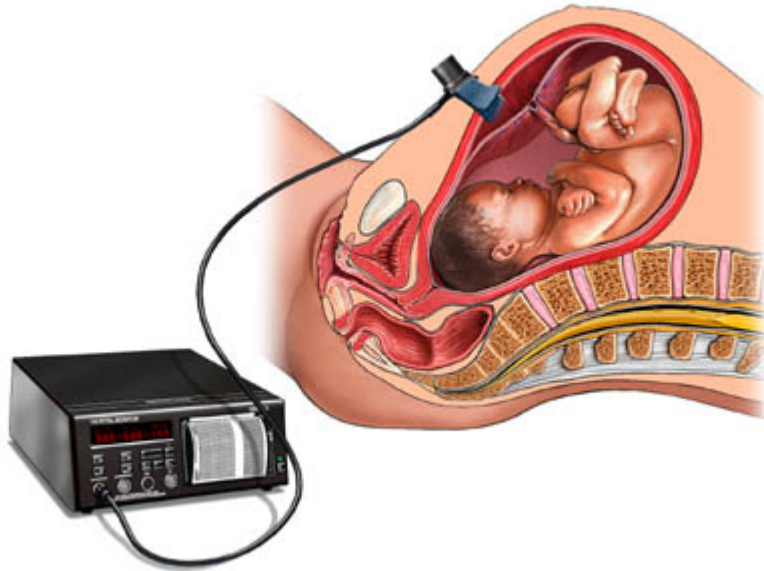


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