

ECG test

An electrocardiogram (ECG) is a medical test that detects cardiac (heart) abnormalities by measuring the electrical activity generated by the heart as it contracts. The machine that records the patient's ECG is called an electrocardiograph.

The electrocardiograph records the electrical activity of the heart muscle and displays this data as a trace on a screen or on paper. This data is then interpreted by a medical practitioner.

ECGs from normal, healthy hearts have a characteristic shape. Any irregularity in the heart rhythm or damage to the heart muscle can change the electrical activity of the heart so that the shape of the ECG is changed. A doctor may recommend an ECG for patients who may be at risk of heart disease because there is a family history of heart disease, or because they smoke, are overweight, or have diabetes, high cholesterol or high blood pressure.

Heart problems diagnosed by ECG

Some of the various heart problems that can be diagnosed by ECG include:

- Enlargement of the heart
- Congenital heart defects involving the conducting (electrical) system
- Abnormal rhythm (arrhythmia) – rapid, slow or irregular heart beats
- Damage to the heart such as when one of the heart's arteries is blocked (coronary occlusion)
- Poor blood supply to the heart
- Abnormal position of the heart
- Heart inflammation – pericarditis or myocarditis
- Cardiac arrest during emergency room or intensive care monitoring
- Disturbances of the heart's conducting system
- Imbalances in the blood chemicals (electrolytes) that control heart activity.

A person with heart disease may have a normal ECG result if the condition does not cause a disturbance in the electrical activity of the heart. Other diagnostic methods may be recommended if heart disease is suspected.

Medical issues to consider with an ECG

A doctor may recommend an ECG if a patient is experiencing symptoms such as chest pain, shortness of breath, dizziness, fainting, or fast or irregular heartbeats (palpitations). ECGs are often performed to monitor the health of patients who have been diagnosed with heart problems, to help assess artificial cardiac pacemakers or to monitor the effects of certain medications on the heart.

There is no need to restrict food or drink prior to the test. You should always let your doctor know what medications you are taking before you have an ECG, and if you have any allergies to adhesive tapes that may be used to attach electrodes.

Electrocardiogram procedure

You strip to the waist so that electrodes can be attached to your chest and limbs. Women should consider wearing a separate top to their trousers or skirt to allow easy access to the chest. The selected sites are shaved, if necessary. Sensors called electrodes are attached to the chest, arms and legs, with either suction cups or sticky gel. These electrodes detect the electrical currents generated by the heart that are measured and recorded by the electrocardiogram machine.

The three major types of ECG include:

- **Resting ECG** – the patient lies down. No movement is allowed during this time, as electrical impulses generated by other muscles may interfere with those generated by your heart. This type of ECG usually takes five to 10 minutes.
- **Ambulatory ECG** – ambulatory or Holter ECG is performed using a portable recording device that is worn for at least 24 hours. The patient is free to move around normally while the monitor is attached. This type of ECG is used for patients whose symptoms are intermittent and may not appear during a resting ECG. People recovering from heart attack may be monitored in this way to ensure proper heart function. The patient usually records symptoms in a diary, noting the time so that their own experience can be compared with the ECG.
- **Cardiac stress test** – this test is used to record a patient's ECG while the patient rides on an exercise bike or walks on a treadmill. This type of ECG takes about 15 to 30 minutes to complete.

Immediately after an ECG procedure

The electrodes are removed. An ECG is completely painless and non-invasive, as the skin is in no way penetrated. The doctor can interpret the results of your ECG straight away based on your medical history, symptoms and clinical examination.

Possible complications of an ECG

The ECG is a safe procedure with no known risks. It does not send electric current to the body. On occasion the patient may be allergic or sensitive to the electrodes causing local skin reddening.

Taking care of yourself at home

The patient can resume normal activities immediately. The ECG is non-invasive and doesn't involve medications (such as anaesthetics) or require recovery time.

Long-term outlook

The results of your ECG will determine your treatment, if any. Treatment depends on the diagnosed condition but may include, for example:

- **Arrhythmias** – medication or surgery (such as installing an artificial pacemaker)
- **Coronary artery disease or heart attack** – medications including beta-blockers, quitting cigarettes, dietary changes and coronary artery bypass surgery
- **High blood pressure** – dietary changes, regular exercise and medications.

Other forms of treatment

Other tests that help diagnose heart problems include:

- Physical examination
- Chest x-rays
- Echocardiogram (ultrasound of the heart)
- Magnetic resonance imaging (MRI) or computerised tomography scans of the chest
- Blood tests
- Cardiac catheterisation (insertion of a catheter through the blood vessels of the groin into the heart).

Where to get help

- Your doctor
- In an emergency, call triple zero (000) for an ambulance

Things to remember

- An electrocardiogram (ECG) is a medical test that detects cardiac abnormalities by measuring the electrical activity generated by the heart as it contracts.
- A doctor may recommend an ECG for patients because of their symptoms or who may be at risk of heart disease because there is a family history of heart disease, or because they smoke, are overweight, have diabetes, high cholesterol or high blood pressure.
- The ECG is a safe and non-invasive procedure with no known risks.

This page has been produced in consultation with, and approved by:

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