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## **ECG (electrocardiogram)**

### **What is an ECG?**

ECG (electrocardiogram) is a test that measures the electrical activity of the heart. The heart is a muscular organ that beats in rhythm to pump the blood through the body.

The signals that make the heart's muscle fibres contract come from the sinoatrial node, which is the natural pacemaker of the heart.

In an ECG test, the electrical impulses made while the heart is beating are recorded and usually shown on a piece of paper. This is known as an electrocardiogram, and records any problems with the heart's rhythm, and the conduction of the heart beat through the heart, which may be affected by underlying heart disease.

### **What is the resting ECG used for?**

The information obtained from an electrocardiogram can be used to discover different types of heart disease. It may be useful for seeing how well the patient is responding to treatment.

- It is a good idea to have an ECG in the case of symptoms such as dyspnoea (difficulty in breathing), chest pain (angina) fainting, palpitations or when someone can feel that their own heartbeat is abnormal.
- The test can show evidence of disease in the coronary arteries. Unfortunately, in many people who have significant narrowing of the arteries supplying the

heart muscle, the ECG recording made at rest is often normal. Therefore, if a significant narrowing is suspected, an ECG recording is often made when the patient is exercising (an exercise stress test) as this is more likely to reveal the problem.

- An ECG can be used to assess if the patient has had a heart attack or evidence of a previous heart attack.
- An ECG can be used to monitor the effect of medicines used for coronary artery disease.
- An ECG reveals rhythm problems such as the cause of a slow or fast heart beat.
- To demonstrate thickening of a heart muscle (left ventricular hypertrophy), for example due to long-standing high blood pressure
- To see if there are too few minerals in the blood.

An ECG may appear normal even in the presence of significant heart disease. Thus, for a full assessment of the heart, other tests may be needed.

### **How is an ECG performed?**

It depends on what is being measured. Usually, an ECG is taken while the patient is resting, but if there is concern that a patient's symptoms may be caused by coronary artery disease the test is done while the patient is on an exercise bike or treadmill.

It may also be used to assess the success of drug treatment or coronary revascularisation such as coronary intervention or bypass surgery.

It may be necessary to supplement an ECG with additional tests, such as a radioisotope perfusion scan, which uses low-dosage radioactive dye to show which areas of the heart muscle receive the best and worst blood supply, or angiography (X-ray examination of arteries), to determine the extent of the illness and the cause of symptoms.

### **How is an ECG performed?**

- Up to 12 self-adhesive electrodes will be attached to select locations of the skin on the arms, legs and chest. Areas such as the chest where the electrodes will be placed may need to be shaved. First, the skin is cleaned. The test is completely painless and takes less than a minute to perform once the leads are in position. After the test, the electrodes are removed.
- The doctor will review the paper print-out of the ECG.

### **Is an ECG dangerous?**

- When the patient is at rest it is completely harmless.
- If an exercise test is performed, the patient may get chest pains that will resolve after the exercise is stopped. This examination must be supervised by a medical doctor in addition to the ECG technicians. If necessary, the test will be discontinued at an appropriate time such as in the case of significant chest pain, changes on the ECG, a drop in blood pressure or simply when the patient achieves their target heart rate.