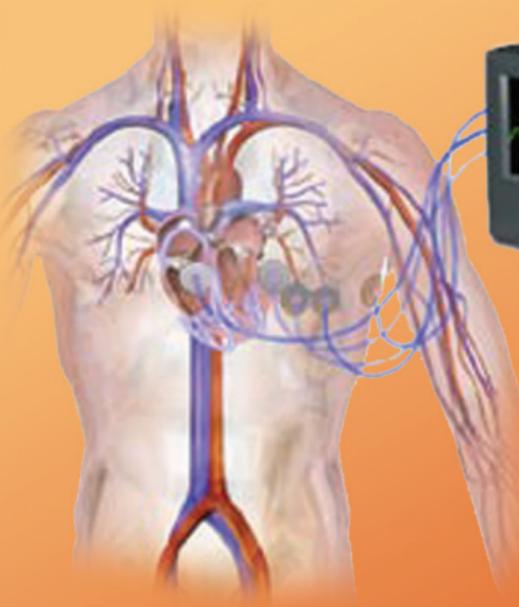


# Non-Invasive Cardiac Tests



# What is an Electrocardiogram?

An electrocardiogram (EKG or ECG) is a recording of the heart's electrical activity as a graph or series of wave lines on a moving strip of paper. This gives the doctor important information about the heart, such as its' rate and rhythm, and it is easy, fast, non-invasive and painless.

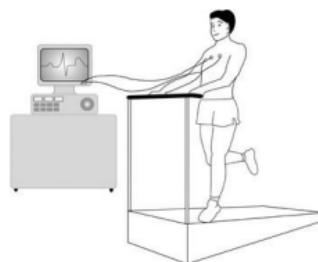
## How is it done?

The patient lies on a bed and electrodes are placed on the bare chest wall. If the chest is hairy, some shaving is required for good contact of the electrodes. The electrodes record only electricity that passes naturally through the heart and electricity does not pass from the pads to the patient.

The clinical technician will enter the patient's information into a computer. The patient will then be asked to lie perfectly still for several minutes while resting—heart activity is measured and recorded. Each electrode produces a “tracing” or “lead” of a particular area of the heart and its activity.

## Exercise ECG (Treadmill ECG)

An exercise stress test is a special diagnostic test used to measure the heart's performance under stress to detect various forms of heart disease. The most common form of exercise stress test combines some form of exercise with an ECG to measure the heart's activity both at rest and while exercising.



## How is the test performed?

This test requires the patient to walk on a treadmill machine at varying speeds and elevations to assess the heart's activity during physical stress.

## Why is exercise ECG useful?

A normal ECG recorded while the patient is at rest may not detect certain abnormalities that may occur during exertion. A resting or non-stress ECG may therefore be inadequate in ruling out suspected heart disease which may be unmasked by exercise stress.

During an exercise stress test, the doctor will evaluate the patient's general state of health and the heart's reaction to exercise. As the intensity of the workout increases, the patient's heart rate and rhythm, blood pressure and general condition are continuously monitored on the ECG and by the doctor.

The higher the level of exercise, the harder the heart has to work and the more blood flow is needed. This test therefore allows the doctor to assess whether the blood supply to the heart is sufficient during different levels of exercise intensity.

## What is the risk?

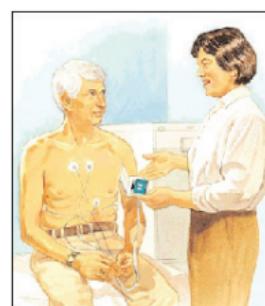
The risk of an adverse event such as a heart attack is approximately 1 in 10,000, but certain contraindications exist and this test should not be ordered for patients who have:

- suffered a heart attack in the previous two days
- unstable angina
- uncontrolled arrhythmias, or abnormal heart rhythms
- severe symptomatic aortic heart valve disease
- uncontrolled heart failure
- infection or inflammation of the heart
- acute aortic dissection
- acute pulmonary embolism

Your doctor will decide on the test for you and informed consent will be taken before you proceed.

## Holter Monitoring

Holter monitoring is an ambulatory ECG that monitors electrical activity of the heart continuously for at least 24 hours. It is most often used when the cardiologist suspects an abnormal heart rhythm or lack of oxygen supply to the heart.



## How is the test performed?

As in ECG recording, electrodes from the Holter monitor are taped to thoroughly-cleansed areas on your chest. You can then leave and go about your regular daily activities except for:

- bathing or showering
- going near high-voltage areas, metal detectors or large magnets
- having any contact with an electric blanket

You will be asked to keep a diary of your activities and any physical symptoms you may experience such as palpitations or chest pain. Such a diary is very helpful to the cardiologist who will match symptoms experienced with the corresponding heart activity in the final printout.

This test will normally last 24 hours but can be extended as required.

After the prescribed testing period is over, you will return to the hospital to remove the holter electrodes, and the recorded results will then be analyzed and printed out.

## Ambulatory Blood Pressure

Ambulatory blood pressure monitoring (ABP) is a method of taking regular blood pressure readings, usually over a 24-hour or 48-hour period, as patients conduct their normal activities.

A special, automatic blood pressure monitor is used to measure blood pressure at regular intervals automatically, through both day and night, even while the patient is asleep.



# How is the test performed?

The ABP monitor is automatic, lightweight (about 1 pound or less) and quiet. It consists of an arm cuff, a tiny computer and a small compressor that inflates the arm cuff.

The compressor and computer are generally worn on a belt around the waist with a tube leading up to the arm cuff. The monitor is programmed to automatically inflate the cuff at set intervals during the ABP period, usually once every 30 minutes or an hour at night, every 15 minutes or 30 minutes at day time.

The frequency of measurements may be programmed differently overnight to minimize sleep disturbance and adjust for the fact that changes in blood pressure are less dramatic when the patient is at rest.

You are asked to keep a diary or log of your activities during your working hours.

After the required period of monitoring is over, you will return to the hospital and the ABP will be removed.

Coupled with an activity diary, the ABP can give your cardiologist a very accurate picture of factors that might be affecting your blood pressure, such as exercise, eating, medications and certain forms of heart disease.

It is also very useful for achieving optimal control of your hypertension, especially in guiding fine adjustments of dosages of your antihypertensive medication.

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