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How doctors evaluate and treat chest pain of suspected cardiac origin - Part 1: Investigation

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Coronary heart disease (CHD) is the leading cause of death both in the UK and worldwide causing more than 73,000 deaths in the UK each year.

What causes coronary artery disease?

In simple terms, the arteries that supply the heart muscle become progressively clogged up with plaque deposits (containing cholesterol). This often leads to a gradual reduction in blood flow to the heart but the artery can become completely blocked leading to a heart attack.

What factors can increase your risk of CHD?

There are genetic factors (family history) but other strong risk factors include smoking, diabetes, high blood cholesterol, high blood pressure and obesity.

What symptoms are associated with CHD?

Unfortunately, there may be none before you're presented with a cardiac event such as a heart attack. However, many patients will have symptoms that include some sort of chest discomfort (angina) which is classically brought on by exercise or stress and relieved by rest. The pain may appear to spread to the jaw or the upper arms and it may be associated with breathlessness, sweating or palpitations (heart racing).

What should I do if I think I am getting angina?

If you are experiencing recurrent but self resolving chest pains, you should make an appointment to see your GP as soon as possible. If you ever suffer from prolonged severe chest pain, then you need to seek urgent medical attention in the emergency department. Your GP should take a full history and perform an examination. Depending upon this initial evaluation, the GP will most probably refer you to a heart specialist or cardiologist.

How do cardiologists investigate patients with suspected angina?

When you see a cardiologist, he or she should be able to tell how likely it is that your symptoms are due to underlying coronary disease. If there is a high probability of CHD, then the cardiologist will advise that you undergo a diagnostic test which is called a coronary angiogram. Alternatively, we may feel that the probability of coronary disease is generally low or intermediate. In these circumstances, we will often advise that you undergo other investigations looking for more objective evidence of a blood supply problem to the heart (non-invasive tests).

What does a coronary angiogram entail? This is routine day case investigation which uses X-rays to visualise your coronary arteries and thereby clarifies whether there is any severe narrowing or blockage. It is regarded as the gold standard to diagnose CHD but also categorised as an invasive test which carries a very small risk of serious complications. Based on the findings of this test (specifically the pattern and extent of disease), further treatment options (coronary angioplasty or coronary bypass surgery – See Part 2 article) can be explored.

What are non-invasive cardiac stress tests?

These tests will often be advised when we are doubtful about whether your symptoms are due to underlying CHD. The most widely available test is a treadmill exercise tolerance test (ETT) but this has limitations and is not suitable for many patients.

Another test, myocardial nuclear perfusion scan is very sensitive but it involves using radiation and therefore may not be the ideal test for younger patients.

Alternatively a stress echocardiogram does not use any radiation and can be performed either with patients walking briskly uphill on the treadmill or using a drug to stimulate the heart for those unable to adequately exercise.

There is also another test called a coronary CT angiogram. This test still involves using radiation to directly image the heart blood vessels. It can be performed relatively quickly and provides reassurance, especially when the probability of disease was low in the first place and the test then confirms normal arteries.