Having an Exercise ECG

As part of your annual health assessment you will be offered the option of having an exercise-ECG to help assess if you could have early signs of heart disease. Like most tests *it is not infallible* and before you decide to have the investigation it is worthwhile to read this summary in which the pros and cons of this form of testing are explained.

What does the Test involve?

An exercise-ECG is an electrocardiogram that is recorded while you are exercising on a treadmill. Other than the exertion involved it is painless! Several small sticky patches are put on your chest and connected to an ECG recorder to monitor your heartbeat. You will then be asked to exercise on the treadmill. The test starts off at a very easy pace and is gradually made harder by increasing the speed and slope of the treadmill. While you are exercising the technician carefully checks your ECG reading, blood pressure and pulse. You will be told when to stop, usually when the measurements are completed. You may also be told to stop if you experience chest pains, become excessively tired or unduly short of breath. You can also stop at any time if you feel you cannot continue with the test. The exercise test usually takes up to 15 minutes. It can be hard work, but should not be too much for you. Extremely rarely there are risks associated with the test such as provoking unexpected severe angina, heart attacks and even (very rarely) death.

Results of Testing

We know that the exercise-ECG is a very useful diagnostic test used to investigate people who do have possible symptoms of heart disease e.g. chest pain on exertion.
However, the situation is rather different when it is being used for screening, as in your case, fit people with no symptoms of heart problems. In these situations an exercise-ECG is less accurate.

After the exercise test your results are primarily either 'negative' or 'positive'.

• A negative exercise-ECG means there are no unusual or obvious changes to the heart shown on the ECG during the test.
• A positive exercise-ECG is when significant changes are seen on the ECG during exercise which may indicate underlying heart disease and the need for further investigation.

The test can however give misleading information:

- False Negative test: The test fails to identify people who do have coronary heart disease and they are potentially therefore falsely reassured.
- False Positive test: The test mistakenly identifies someone as potentially having heart disease when they do not. (This is particularly likely in young women.)

Because exercise testing has this risk of false negative and false positive results, it is important that you consider both the advantages and disadvantages of having the test. It is very difficult to give entirely accurate figures with regards to the rates of false negative and false positive tests; however some broad estimates are given below:

- Approximately 10 - 20 people in 100 of the screened population are likely to have a positive exercise test which may suggest coronary artery disease.
- Of these positive tests only 1 in 3 are likely to have true coronary artery disease (true positives) and conversely 2 in 3 will NOT have coronary artery disease (false positives). To identify the 1 true case of coronary artery disease, 2 people will need to undergo further tests 'unnecessarily'.
- Another 3 people per 100 will have diseased arteries but not have been identified by the test (false negatives).

So, if you have a positive test there is an approximately 1 in 3 chance that you do NOT have a significant heart problem but further tests will probably be needed to clarify this.
The diagnostic accuracy of exercise ECG testing is less in women and the rate of false positives is even higher.

The vital consequence of the 'false positive test' you must appreciate is the need for extra tests and inevitably the worry it causes you and your family until a diagnosis is clarified.

However, do not be unduly alarmed if your exercise test is positive. It is also known that even if the exercise-ECG is positive *in people with no other symptoms of heart disease* such as angina or high blood pressure, the risk of suffering a heart attack is still very low at only 1-2% per year.
Though quite complex, we feel it is helpful for you to have some insight into these figures. It is no use to our patients to simply identify that you have a degree of coronary artery disease. Indeed simply learning that you have signs of coronary artery disease will cause you a lot of worry when, quite possibly, the condition may never develop to a stage where it could cause you any harm.

Ideally we would like to identify only those people who are very likely to experience a serious event, e.g. a heart attack and/or death, as the potential consequence of their disease so that we focus treatment particularly on these people at higher risk

Unfortunately we also know that in most cases the people who actually do die of heart disease could quite probably have had a negative exercise test result, because the ability of the exercise test to detect those people at severe risk is low. *Presently we still have no simple, non-invasive tests that are able to identify those persons at highest risk.* Even the latest 'heart scans', using calcium scoring, can have similar advantages and disadvantages.

However, there is an upside. If you have a normal test in conjunction with a normal examination by your doctor, most patients do find this very reassuring. Obviously this should not encourage you to continue bad habits such as smoking and failing to take any exercise.

What will happen if I have a positive exercise test?

If you have a positive exercise test it is most likely that you will be referred to a Cardiologist for a further opinion which will quite probably include the advice to have further more specialised tests. The present 'gold standard' is a 'cardiac catheterisation'. This test involves injecting dye via a needle placed in the groin into the arteries surrounding the heart to clarify their appearance. A cardiac catheterisation test gives vital information to show if there are any narrowings in the coronary arteries and if so, their severity. A common after-effect is for a large bruise to form in the groin which is not serious, but may be uncomfortable and inconvenient for a few days.

Serious complications of this test are very rare, but it would be wrong to give the impression that investigations such as this can be performed without any risk at all. The chances of the test causing a serious complication (primarily heart attack and stroke) are about 1 in every 500. So, the Cardiologist will not recommend a catheterisation test unless he or she feels that the benefits outweigh this very small risk after discussion with you.

Conclusions by The American Heart Association.

Finally, below are the conclusions made by The American College of Cardiology Foundation and the American Heart Association. The full document from which these are taken is very technical but the website address is given below should you wish to read it in more detail.

Population Screening?

General screening programs (for example, those that attempt to identify young patients with early disease) have the limitation that severe coronary artery disease (requiring intervention) in asymptomatic patients is exceedingly rare. Although the physical risks of exercise testing are negligible, false-positive test results may engender inappropriate anxiety and may have serious adverse consequences in relation to work and insurance. For these reasons, the use of exercise testing in healthy asymptomatic persons has not been routinely recommended

Implications for Clinical Practice.

The use of exercise testing for the identification of coronary artery disease in asymptomatic persons is a controversial topic for which the committee had difficulty defining guidelines concordant with widespread current practice. The existing data indicate that although disease may be identified, many more patients have false-positive test results. The consequences of such findings include unnecessary and expensive additional testing, adverse psychological implications, and misuse of data to influence employment and insurance decisions. Before an exercise test is performed on an asymptomatic patient, these issues must be discussed and informed consent obtained.

http://www.acc.org/clinical/guidelines/exercise/exercise_clean.pdf- (pages 35-39 in particular)

The Small Print.

This article was written by Dr Roger Leary to stimulate you to consider the risks and benefits of exercise-ECG screening. It should never be considered to be categorical advice for any individual whose specific circumstances may alter the balance of risks and benefits considerably. All figures are necessarily approximations and different ECG centres with different populations under test will have different ranges.