The heart of the matter

Dr Chris King explains the importance of an ECG – not just for your job, but your life

An electrocardiogram (ECG) is undertaken at variable intervals at your renewal or revalidation medical examinations. Ten electrodes are placed on your body and used to record the ECG. Two left and right on your upper body or left and right arms; two on your lower body or left and right leg; and six electrodes across the front of your chest.

Measuring the electrical potentials between different combinations of these electrodes allows the recorder to map the electrical activity generated by your heart in both horizontal and vertical planes.

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The results are then represented graphically to produce the ECG tracing. Examination of this trace can indicate the condition and function of the heart muscle, the nature of the heart's rhythm and the health of its conduction system.

When studying the ECG, we look at the rhythm and rate of the heart to see if it is regular. We also check for extra beats (ectopic beats), and look at the conduction system of the heart to make sure that it is co-ordinated and that the atria and ventricles are contracting in the most efficient way. We can also get a picture of the health of the heart muscle.

The ECG is part of the cardiovascular risk assessment undertaken at your medical, together with family history, height, weight, urine, pulse, blood pressure, lipid estimation at age 40 and assessment of smoking and alcohol.

Heart disease is a potential cause of sudden incapacitation on the flight deck. JAA rules state that there must be a less than one per cent per year chance of sudden incapacitation on the climb and descent. Therefore, cardiovascular risk needs to be assessed at every medical.

Abnormal may mean normal

There are certain ECG machines approved by the CAA for use at your medicals. All have inbuilt computers with the ability to produce a brief report on the condition of the ECG. These are set to be overly sensitive, so that abnormalities are not overlooked. Because of this, a number of ECGs are coded as abnormal (see below), when in fact they will be normal.

All class 1 ECGs are sent off to the CAA for assessment. Class 2 ECGs are read by a local cardiologist if abnormal. If the class 1 ECG is normal, it is coded 55 and not looked at by a cardiologist. If there is any abnormality, it is coded 56 and seen by a cardiologist, but the medical is not usually deferred. Clearly, if there is something of significance, it would be discussed with the CAA at the time of the medical. Only in rare situations is the medical deferred. In this case the ECG would be faxed over to the CAA for an urgent assessment.

ECGs coded as 56 are not uncommon. Sometimes, the ECG 'abnormality' can be reversed by taking a deep inspiration or expiration while the ECG is undertaken, and a number of you might have been asked to do this. The ECG can be affected by the shape of your chest in that tall, slim individuals can have a different ECG to short, squat individuals. Pilots who are very athletic and who undertake extreme exercise such as triathlons or biathlons sometimes have unusual ECGs.

It is important to remember that the ECG machine has no clinical flexibility in its interpretation. There is a wide variation of normal ECGs which the ECG machine is unable to cope with, hence the 55 or 56 coding and subsequent interpretation by a CAA cardiologist.

If the CAA cardiologist is unhappy with your ECG, you may receive a letter from them asking you to undergo further investigation by way of an exercise ECG, echocardiogram, 24-hour monitoring or cardiology opinion. Do not be overly alarmed as the majority of these will be normal.

As well as the flying aspect, cardiac screening can pick up and and enable cardiac problems to be treated at a much earlier stage than 'Joe Public'. As I say to pilots on many occasions, "your health comes first and flying is a very close second". I am not sure how many of you agree with this sentiment!

It is quite common for an ECG 'abnormality' to persist from medical to medical. One of the reasons for sticking with one AME/practice is that previous ECGs can be compared and are often identical over the previous years. If the 'abnormality' has been previously investigated, the AME can usually reassure you at the time of the medical and issue the certificate in the normal way.

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