



EKG'S

UNLOCKING THE SECRETS OF YOUR HEART

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It is the most recognized symbol in cardiology.

Those repetitive squiggles on a monitor show all is well when beating regularly but as many Hollywood movies attest to, they signal death when they become a flat line. The EKG (electrocardiogram) was discovered in 1902 and won Dr. Willem Einthoven the Nobel Prize in Medicine in 1924. It represents the birth of cardiology as a specialty. Today it is part of the annual physical exam and performed millions of times a day around the world. You can get one done using your smartphone or have a chip implanted under the skin that wirelessly transmits for years.

An EKG is a simple test that records the electrical activity of the heart. It is the electrical

fibers that coordinate the contraction of the four heart chambers in proper sequence. Each heart beat causes an electrical impulse which can be labelled as the P-wave (atrial activity) QRS complex (ventricular contraction) and T-wave (ventricular relaxation). By looking at the electrical activity one can tell if someone is in regular rhythm or having an arrhythmia. Arrhythmias originating from the upper chamber of the heart include SVT — supraventricular tachycardia, or AF — atrial flutter or atrial fibrillation. Arrhythmias originating from the lower chamber of the heart include VT — ventricular tachycardia or VF — ventricular fibrillation which are often life threatening. The EKG

can also pick up “skipped” beats such as PAC’s — premature atrial contractions and PVC’s — premature ventricular contractions. Normal heart rates are between 60-100 beats/min. A heart rate over 100 is considered a tachycardia while less than 60 is a bradycardia.

Normally, the electrical activity travels down nerve fibers of the heart in a consistent manner and speed. Sometimes these electrical fibers are damaged. This can result in a right or left bundle branch block (RBBB or LBBB). If both bundles become affected, then you have complete heart block and a pacemaker is required. Sometimes we are born with extra fast electrical fibers that show up as a short PR interval, the most common of which is known as WPW. These patients often need a burning procedure called an ablation to get rid of these fast fibers. Some congenital abnormalities of the heart’s electrical system also show up on an EKG such as a long QT interval. Patients who have this often require a device known as a defibrillator. The QT interval is also what is affected by many drugs and even some supplements. Your doctor or pharmacist will warn you of this potential drug interaction and recommend an EKG to make sure everything is okay.

EKG’s can also tell us if the heart is enlarged. This is often due to high blood pressure. It can tell us about a previous heart attack. It can even tell you if the chest pain you are having at the time of an EKG is due to a major heart attack called STEMI — ST elevation myocardial infarction.

What EKG’s can’t tell you is your risk for a future heart attack. For that you need to do a stress EKG during which you run on a treadmill while a continuous recording of your EKG is done to see if it changes with exertion. Like all technologies, EKG’s have their limitations. They often report false heart attacks especially in women where the breasts get in the way of proper electrode placement. Electrical interference or too much movement can also make an EKG inaccurate.

While EKG’s are a powerful tool for cardiologists, they represent only 10 seconds of your life. That’s why longer duration recordings such as a 24-hour Holter monitor or a 30-day continuous loop recorder are sometimes used to capture arrhythmias that occur only intermittently. Many apps are now also available that can generate an EKG recording. While they are not always accurate for many individuals it is a useful tool to have when trying to determine the cause of “flutters” and “flops” in the chest! ■