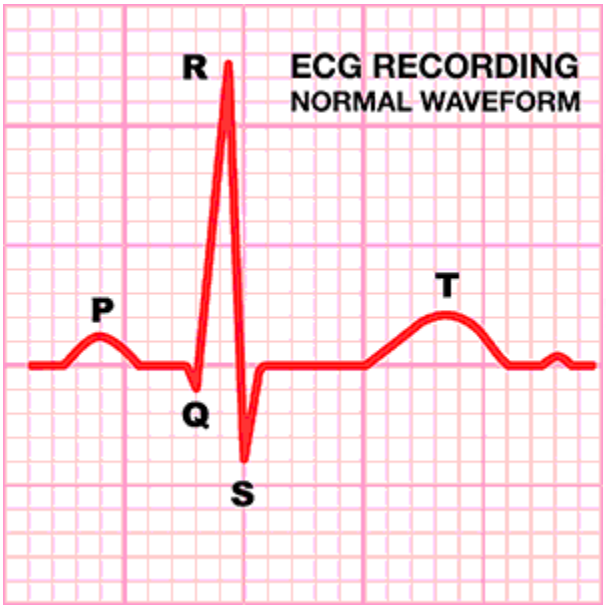
What is an eCG?

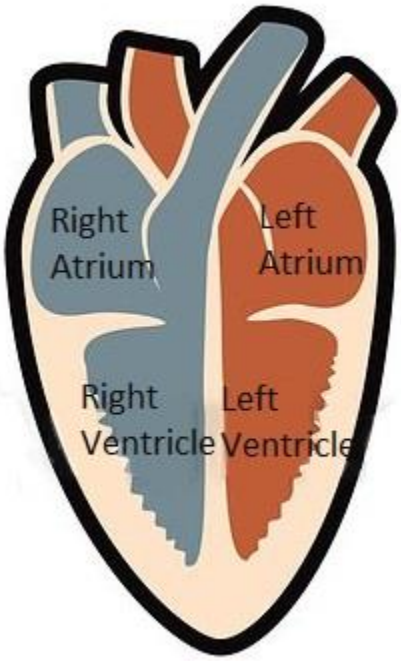
An eCG is an electroCardioGram, it is the electrical signals running through the heart and is one of the more easily recognisable images in medicine thanks to TV medical dramas.

ECGs are used in veterinary medicine in much the same way as they are used in human medicine. All of our surgeries are monitored with an eCG (along with other monitoring devices that check blood pressure, oxygenation, pulse rate and breathing rate) and are also used in assessing cardiac disease (diseases of the heart)

An eCG trace has 3 parts to the wave, these parts all correspond with electrical signals going through the heart and together make 1 heartbeat.

- The P wave is the first part, it is a small domed shape and is the activation of the heart for a heartbeat, it also corresponds with the squeezing of the atria (the top two chambers of the heart)
- The QRS complex is the main article, it is the electricity going through the ventricles (the larger lower chambers of the heart) and corresponds with the main beat – this is the part that results in a pulse, the blood being pushed through the body and lungs.
- The T wave is repolarisation – it's the resetting of the heart allowing it to respond to the electrical signals again.



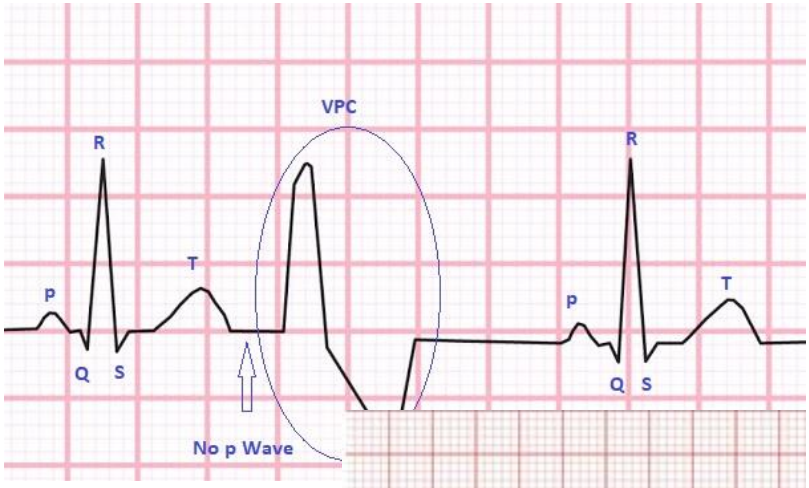


Under an anesthetic we are using the eCG to monitor the heart rate (in combination with checking the pulses and using a stethoscope), but we are also looking for any abnormal waves or patterns.

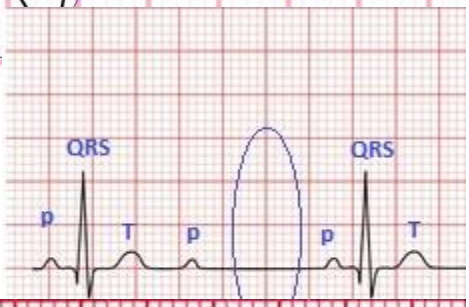
In cardiac cases an eCG is an excellent tool for looking at and assessing rhythms, it gives us a visual for a sound, which in some cases is easier to spot where the beat is going wrong. We can also look for abnormal waves that can give us clues where the disease is.

Some abnormal patterns we can see include:

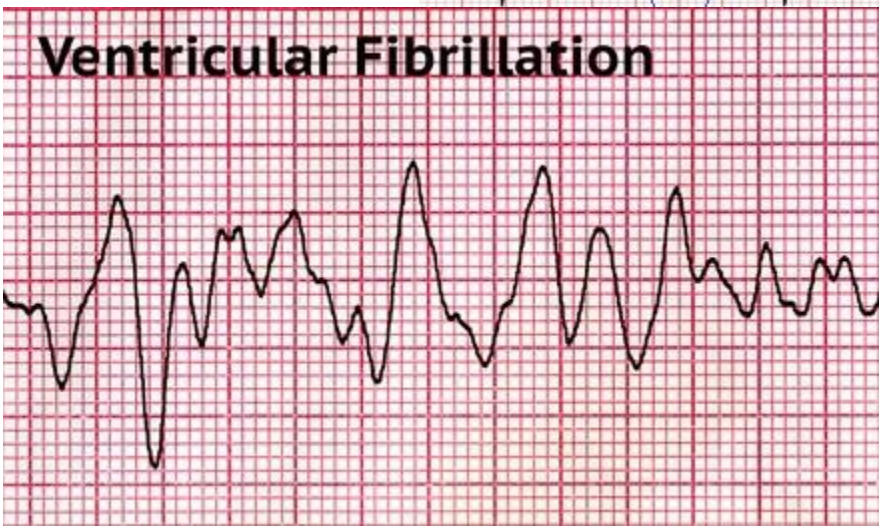
VPC – ventricular premature contraction; This is where the ventricles beat without the normal warm up process of an atrial beat, it has a classical abnormal QRS wave, and there is no p wave associated with it. Under anesthetic we do occasionally see these beats, but they should not be frequent or come in multiples.



AV block, or skipped beats; this is where the p wave fires as normal, but the ventricles don't respond so there is no associated QRS and therefore no pulse, this is one of the easier arrythmias (abnormal rhythms) to hear but is important to confirm with an eCG as it comes in 3 grades of severity, and if significant can require a pacemaker placement.



Tachycardia – fibrillation; tachycardia is an excessively fast heart rate without reason (it is normal for the heart rate to increase with exercise or anxiety). Fibrillation is this to the extreme, in fibrillation there is no recognisable pattern to the eCG, the heart is attempting to beat so fast it is not able to repolarise and the muscle will not beat effectively, this is an emergency, and if protracted will lead to death, this is also what a defibrillator (the electric paddles used



as part of CPR) is designed to correct, this is a more common heart problem for humans then it is for dogs and cats.

ECGs are an important tool in monitoring anesthetics, and the diagnosis, treatment and ongoing monitoring of heart diseases, they are also painless, non-invasive and safe, making them an excellent tool at our disposal.

Good Health

Dr Tony VetHQ