



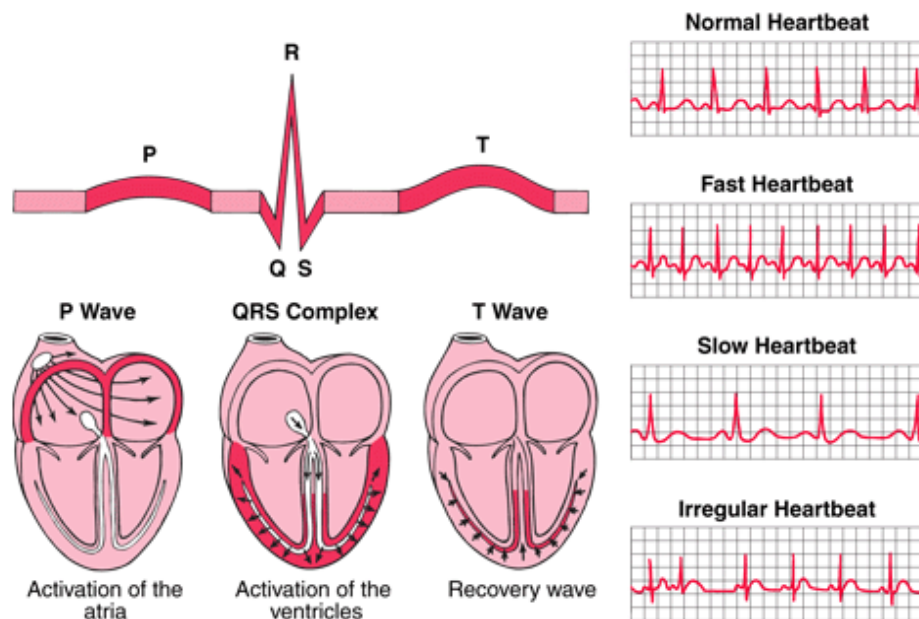
Third Degree Atrioventricular (AV) Block

BRIEFLY, HOW DOES THE HEART PUMP?

The heart has four chambers. The upper chambers are called atria. One chamber is called an atrium, and the lower chambers are called ventricles. In addition to the upper and lower chambers, the heart is also considered to have a right and left side.

Cardiac muscles contract via an electrical stimulus. In a normal functioning heart the stimulus comes from the sinoatrial (SA) node located in the right atrium muscle wall. All cells within the heart have the ability to generate their own electrical activity, but the SA node is the fastest to do so, and therefore, deemed the rate controller or the 'pacemaker'. The SA node initiates the electrical discharge for each cardiac cycle. This conduction 'depolarises' the two atria causing them to contract, before stimulating the two ventricles via the AV (atrioventricular) node.

The heart then 'repolarises' (or refills) in time for the next stimulus and contraction.





ATRIOVENTRICULAR BLOCK

Third degree atrioventricular block (or 3⁰ AV block) is a type of heart block involving impairment of the conduction between the atria and ventricles of the heart. It usually involves the atrioventricular node, but can involve other structures.

Third-degree AV block, also known as complete heart block, is a defect of the electrical system of the heart in which the impulse generated in the atria (typically the SA node) does not propagate to the ventricles.

Because the impulse is blocked, an accessory pacemaker below the level of the block will typically activate the ventricles. This is known as an *escape rhythm*. Since this accessory pacemaker activates independently of the impulse generated at the SA node, two independent rhythms can be noted on the electrocardiogram (ECG). One will activate the atria, the second will activate the ventricles. The hallmark of complete heart block is no apparent relationship between the atria and the ventricles.

One of the most important characteristics of this block is the absolute absence of the opportunity for atrial impulses to enter and capture the ventricles. Patients with third-degree AV block typically experience a lower overall measured heart rate (as low as 28 beats per minute during sleep), low blood pressure, and poor circulation. In some cases, exercising may be difficult, as the heart cannot react quickly enough to sudden changes in demand or sustain the higher heart rates required for sustained activity.

WHAT ARE THE SIGNS OF 3⁰ ATRIOVENTRICULAR BLOCK?

When the heart is not refilling and properly pumping blood, it does not provide adequate oxygen to the body and as a result, causes lethargy or a lack of stamina when exercising.

Patients with complete heart block frequently experience syncope (fainting), though others can have minimal symptoms other than dizziness, or malaise. In these cases, many owners mistake these clinical signs for "old age", as most conduction disturbances generally occur in older patients.





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Signs to look out for may include;

- Exercise intolerance
- Lethargy/weakness or fainting spells
- Change (slow) in heart rate or rhythm
- Low blood pressure
- Poor circulation
- Increased or laboured respiration at rest (normal sleeping respiratory rate is less than 30 breaths per minute)
- Dull demeanour
- Decreased appetite
- Nausea

HOW IS 3⁰ ATRIOVENTRICULAR BLOCK DIAGNOSED?

The best way to diagnose 3⁰ AV block is to perform an ECG (electrocardiogram). This gives us assessment of the electrical activity of the heart and will show us if there is an arrhythmia, cardiac abnormality, or a block of the conduction between the atria and the ventricles.

In some cases we may give your pet an injection of a drug called atropine and perform an 'atropine response test'. In a normal functioning heart this drug will speed up the rate of contraction, however atropine will have no effect on an animal with 3⁰ AV block.

IS THERE TREATMENT FOR 3⁰ ATRIOVENTRICULAR BLOCK?

If your pet has been diagnosed with 3⁰ AV block, the best treatment to correct the problem is to implant a pacemaker. This type of device typically listens for a pulse from the SA node and sends a pulse to the AV node at an appropriate interval, essentially completing the connection between the two nodes. Pacemakers are programmed to enforce a minimum heart rate and to record instances of atrial flutter and atrial fibrillation, two common secondary conditions that can accompany third-degree AV block. Pacemaker implants are routinely performed in our practice, however, if the implantation of a pacemaker is not an option, medical treatment (Theophylline) can be given.





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HOW MUCH LONGER WILL MY PET LIVE?

There are many factors that must be considered before this question can be answered. The results of the tests are important, and the response that occurs within the first few days is another indicator.

An animal can live several years post pacemaker implantation, and since this condition occurs mostly in older patients, it can mean they die of other natural causes.

However, most animals that stabilize quickly will live for a period of a few months to many months, but the long-term prognosis is not good. It can be difficult to generate an accurate estimate for life-expectancy when an animal has heart disease because many variables impact on survival, not least of which is the animal's activity levels.

CardioRespiratory Pet Referrals Pty Ltd ABN: 44 377 192 069
Richard Woolley BVetMed DipECVIM-CA (Cardiology) MRCVS
Registered Specialist in Veterinary Cardiology

Web: www.cprvictoria.com.au

Email: vetcardiology@gmail.com

Mobile: 0410 363 620

