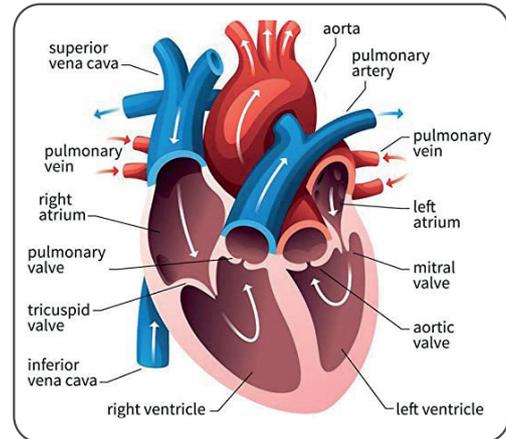


Dilated Cardiomyopathy (DCM)

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What is DCM?



Dilated cardiomyopathy (DCM) is a disease of the heart muscle. It affects humans, dogs, cats, cows, and other species. In dogs, it is known to occur in several pedigree dog breeds with more frequency than others. Predisposed breeds include the Great Dane, Dobermann, Newfoundland, and Irish Wolfhound. In these breeds, DCM can be inherited in family lines.

The heart is a muscular pump, made up of four chambers. The two atria, or receiving chambers, receive blood from the body (right side of the heart) or the lungs (left side of the heart). The blood moves during one heartbeat from the atria into the ventricles, or pumping chambers. One-way valves between the atria and the ventricles stop blood from leaking back in the wrong direction (i.e. from ventricles to atria). It is especially important for heart function that the muscular walls of the heart, the electrical activity of the heart and the valves within the heart are working properly.

As the name suggests, DCM results in thinning of the heart muscle, with gradual dilatation and rounding of the heart chambers. This means that the heart is unable to pump efficiently and so the dog starts to show signs of heart failure. There are many possible signs that the heart is not functioning normally, and these include:

- **Reduced ability to exercise.** The main function of the heart is to pump blood around the body and deliver oxygen to the tissues. Often dogs with heart disease can be normal at rest, but as soon as the body needs more energy and oxygen (like during exercise), the heart is unable to cope.
- **Breathlessness.** In congestive heart failure, fluid leaks out of the blood vessels and into the surrounding tissues. This often occurs in the lungs and is known as pulmonary oedema. The fluid in the lung affects the dog's ability to obtain oxygen from the air it breathes, and so the dog will breathe faster to compensate.
- **Coughing.** Coughing can occur in dogs with heart failure because of fluid build-up in the lung. It can also occur due to massive enlargement of the heart, which presses on the airways causing irritation.
- **Fainting.** It is unusual for dogs to faint with congestive heart failure, but it can occur if the heart is unable to pump enough oxygen to the brain. If a dog faints it is more likely to be due to an arrhythmia (palpitations) caused by disease in the heart muscle. These arrhythmias can be life-threatening and therefore should be investigated and possibly treated.
- Occasionally, build-up of fluid occurs in the abdomen (**ascites**). This can make the dog look pot-bellied.

How do I find out if my dog has DCM?

If your dog shows any of the signs above, then it might have a problem with its heart. It can, however, be difficult to know exactly what the problem is without doing further tests. Your vet may recommend any of the following:

- Blood tests. This is usually to exclude any other possible causes of lethargy, problems breathing etc.
- Auscultation (stethoscope examination) of the heart. Sometimes auscultation can identify heart murmurs. It is important to remember that murmurs can be caused by a huge variety of abnormalities in the heart, and can also, in some cases, be nothing to worry about. In fact, many dogs with DCM do not have heart murmurs at all. Listening to the heart can also identify arrhythmias (palpitations) that might not be causing any clinical signs.
- Heart ultrasound scan (echocardiogram). The **ONLY** way to definitively tell whether a dog has heart disease or not, and what type of heart disease it is, is by an echocardiogram. This allows the vet to examine the heart chambers and valves, to identify any chamber enlargement, reduced pumping ability, or leaky valves. Often your dog will need to be referred to a cardiology specialist for diagnosis, as heart scans can be difficult to interpret.
- Chest x-rays. Although chest x-rays can show enlargement of the heart, this is not the best way to identify heart disease. Chest x-rays can be used, though, to look for build-up of fluid in the lung, or to look for other problems that might cause coughing or breathlessness.

It is very important to remember that in the end stages, **many heart diseases can LOOK like DCM** – the heart will often become rounded and dilated with, for example, valve disease as well. Dilated cardiomyopathy is therefore a diagnosis of **EXCLUSION** – you must rule out other heart muscle or heart valve diseases before making the diagnosis.

In some breeds, screening is undertaken yearly or every 2 years to check for signs of development of DCM. Often, a dog will show impaired pumping ability of the heart, or the heart will start to enlarge a long time before they develop ‘end stage’ dilated cardiomyopathy and heart failure. These early stages are known as **PRECLINICAL or OCCULT dilated cardiomyopathy**.

What can I do if my dog has DCM?

Dilated cardiomyopathy generally occurs in OLDER dogs. It can therefore be difficult to tell if a dog is going to get DCM later in life. This makes it difficult to stop the disease being passed on down generations as most dogs will already have had puppies by the time they are diagnosed. Screening can be useful, as mentioned above.

Unfortunately, there is no cure for DCM. In veterinary medicine, we use a variety of drugs to treat the effects of heart failure, and to try and support the failing heart. There is also growing evidence that some drugs can be used **BEFORE** the dog develops heart failure, to prolong the life of the dog.

Your dog may be treated with any of the following drugs:

- Diuretic (e.g. Furosemide, Prilactone®). These drugs increase the amount of fluid lost in the urine and therefore help to reduce build-up of fluid in the tissues (particularly the lungs)
- ACE Inhibitor (e.g. Fortekor®, Vasotop®, Enacard®). These drugs counteract the adverse hormonal effects that heart failure has on the body
- Anti-arrhythmics (e.g. Diltiazem, Digoxin). The significant stretch and damage of the heart muscle can result in arrhythmias with very fast heart rates, such as atrial fibrillation. These drugs aim to slow the heart rate.
- Vetmedin®. This drug helps to improve the pumping ability of the heart

There is evidence in people, and now a small amount of evidence in dogs, that using an ACE inhibitor in dogs with PRECLINICAL dilated cardiomyopathy can prolong the time to the onset of heart failure. There are also ongoing trials in Dobermanns in the UK and abroad, to see if Vetmedin can prolong time to onset of heart failure in dogs with DCM.

I have a Great Dane – how can I help to prevent this disease?

As we have mentioned, it can be very difficult to control dilated cardiomyopathy in dogs, as dogs that develop DCM are usually older, and have therefore already passed their genes on to their puppies (and in many cases their puppies have also been bred from) before the disease is diagnosed.

At the University of Liverpool, we are currently conducting research in to dilated cardiomyopathy in Great Danes, to try and understand this disease more fully, so that we can start to try and reduce the number of dogs getting DCM.

This was initially started as part of the LUPA project (see www.eurolupa.org) which is a large, European project investigating a variety of genetic diseases of dogs. We started screening dogs for DCM, and collecting DNA samples from Great Danes, and dogs of other breeds (Newfoundland, Irish Wolfhound, Dobermann, and Boxer), in an attempt to identify the gene or genes responsible for DCM in these dogs. This research is still ongoing. We hope to be able to identify genetic markers, that will identify dogs at risk of developing DCM, and/or passing it on to their offspring. This is probably still a long way in the future, but we hope to be able to advise breeders on the best methods to reduce the prevalence of DCM in the breed.

We would greatly appreciate DNA samples from dogs diagnosed with DCM of any of these breeds to be provided for our research. We are also in need of samples from older, healthy dogs. If you would like to contribute a DNA sample from your dog, please contact Hannah Copeland at the University of Liverpool.

With generous funding from the Kennel Club and the Great Dane Breed Council, we are continuing our research into Great Dane DCM, specifically. We hope to answer the following questions:

- How many Danes in the UK are affected by DCM?
- What clinical signs do they show?
- Do they get arrhythmias (palpitations) as part of their heart disease?
- Is sudden death a problem in Great Danes in the UK, and what causes it?
- How is DCM inherited in Great Danes?
- What other tests can we do to identify DCM early in life?

As part of this research, we are inviting **any Great Dane aged FIVE or older** for screening at the University of Liverpool. We are particularly interested in dogs from lines that are suspected or known to have DCM, but we would also be very keen to screen dogs from 'clear' lines too. All we ask is that you have some pedigree information from your dog (ideally 3+ generations, but just dam/sire details would be sufficient).

In return, we offer full heart screening, **FREE OF CHARGE**, to include:

- A clinical examination, paying particular attention to auscultation of the heart
- An electrocardiogram (ECG) to look at the electrical activity of the heart
- A full colour Doppler heart scan (echocardiogram)
- A screening blood sample, to check for the presence of other diseases

There are many unanswered questions about DCM in Great Danes, and **our preliminary research suggests that a remarkably high proportion of the population may be affected by this disease (as much as 20%)**. We really need you and your dog's help to learn more about this devastated disease and hopefully reduce the prevalence in the UK population.

If you would like any more information, or you would like to enquire about our research, please do not hesitate to contact Joan Toohey at the University of Liverpool:

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