Feline Aortic Thromboembolism (FATE) ("Saddle Thrombus")

What is a saddle thrombus?

This is a condition that affects cats and can occur very suddenly and often without any previous signs or symptoms.

The condition occurs when a blood clot (called a \textit{thrombus}) forms/lodges at the point where main blood vessel leaving the heart (\textit{the aorta}) divides in the arteries for the back legs (\textit{the iliac arteries}) and the vessel supplying the tail. This area of vasculature is called the \textit{aortic trifurcation} as one vessel effectively turns into three. When a thrombus blocks a blood vessel, it is called an \textit{embolism}.

The aorta is the widest artery in the body, and when it splits at this trifurcation, the diameter of the iliac vessels become significantly smaller.

The thrombus will normally form in the heart and will usually travel out of the heart and down the aorta without causing any problems. However when the clot reaches the narrower iliac arteries, it will often travel down one of them a short way, and then get stuck. Occasionally a larger clot can block both the iliac vessels.

As soon as the blood clot gets stuck, it occludes most/all of the blood flow down this iliac vessel and this means that the leg no longer has an arterial blood supply.

This means that the vital supply of blood and oxygen to this limb is abruptly stopped and leaves no alternative or collateral circulation to provide any backup.

What causes the blood clot?

The blood clot (\textit{thrombus}) is almost always formed in a chamber of the heart called the Left Atrium. This is usually due to some form of heart problem that causes abnormal blood turbulence. The blood doesn’t like being agitated and so often starts to form tiny "micro-clots" that eventually start to grow into much larger clots. This is often likened to the ball that sits in a traditional whistle. What can happen is either the whole clot can eventually be ejected from the heart, or more commonly a piece will break off and then this will exit the heart. There is a video here of a similar condition in a human: \url{http://www.youtube.com/watch?v=zHdPtm32YZQ&NR=1} (you can see the circular clot floating around the chamber on the right of the screen!)
What sort of heart problems can cause the clot?

In theory, any heart disease that causes abnormal blood turbulence can cause a thrombus to form in the left atrium. However usually it is due to:

- Hypertrophic Cardiomyopathy (HCM) – by far the most common.
- Restrictive Cardiomyopathy (RCM)
- Dilated Cardiomyopathy (DCM)
- Mitral Valve Disease (MVD)
- Atrial Tumours/Other Cardiac Tumours.

Sadly – many of these heart problems (HCM, RCM and DCM) can often be present without any clinical signs or overt signs of cardiac disease. This means that often neither the owner nor your vet may know or be suspicious that a heart problem is present. Rather alarmingly, a thromboembolism can sometimes be the very first symptom of a heart problem.

What are the symptoms of a saddle thrombus?

The signs will normally come on incredibly quickly (within minutes) and are severe and distressing. Signs may include:

- Sudden onset severe pain – manifested as howling/crying/screaming.
- Hiding away and not wanting to be moved or touched. Cats can be quite aggressive due to the pain.
- They are often “open mouth panting” or showing a marked increase in respiration rate.
- They usually cannot walk and may drag one or both back legs behind them when they try to move.
- The affected limb(s) are often very cold to the touch (especially the paws) and the toes may have a blue/pale colour to them.
- After a few hours the limb(s) will effectively be “dead” and then the pain seems to go. If an owner is not present during the early stages of this disease, the cat may present as a cat which is comfortable but cannot use the limb(s).

Many people mistake the symptoms for signs of trauma such as a broken back, broken leg or being hit by a car. The signs can come on so quickly that cats can go from being completely normal to being in severe distress in the matter of a few minutes.

These symptoms are a TRUE EMERGENCY and your vet should be called as soon as possible.
How will my vet diagnose a saddle thrombus?

Your vet may well be suspicious based on the history and the clinical signs. However a few other tests may be required and this may involve:

- Check the temperature of the back feet.
- Checking to see if a pulse is present on the back toes (a special machine called a Doppler machine is used that detects blood movement in the vessels over the toes).
- Checking the glucose levels from the affected foot/feet and comparing them to a normal foot. If the blood supply is disrupted, the glucose level from the suspected limb(s) will be considerably lower.
- Ultrasound of the vessels of the trifurcation or the heart itself to check for thrombus formation.

What can be done to treat a saddle thrombus?

Initially your vet will give your cat high doses of very powerful painkillers whilst the examination and diagnosis is obtained. This may be morphine, methadone or similar.

Once the diagnosis is made – the prognosis is unfortunately very poor indeed. Treatment can be attempted using special clot dissolving drugs such as Heparin but this is very rarely effective as once the clot has lodged, the limb is irreversibly damaged. Indeed often within a few days – the limb(s) can start to go gangrenous due to the lack of blood supply.

Recently studies have shown that if the clot busting drugs are given within a few minutes of the clot forming or if the obstruction is only partial – then there is a chance of the problem being treated. Otherwise the chance of success is so low, that it is usually not fair on the animal to even attempt it.

If only one limb is affected, it can be amputated – however it has to be appreciated that due to the underlying heart disease that is likely to be present, there is the likelihood of further embolisms occurring later on down the line. We rarely advocate amputation due to the risk of recurrence of the problem in the remaining leg being so high.

Very sadly, animals that are affected by a saddle thrombus are usually euthanased on welfare grounds.

Can anything be done to prevent a saddle thrombus?

Prevention is certainly the way forward. If your vet is worried about the presence of heart disease then it may be prudent to put the cat on certain “anti-clotting” drugs as a prophylactic measure. Heart disease in cats may present as:

- An audible heart murmur
- A change in rhythm (either an abnormal rhythm or a gallop rhythm)
- Breathing problems due to fluid in the lungs or around the lungs.

For more information, visit: www.biltonvets.co.uk/advice.html
If your vet suspects heart disease, then it may be necessary to do a blood test, ultrasound scans (echocardiography) or may require referral to a heart specialist.

Sadly, as mentioned before, not all cats with heart disease will have symptoms.

**What animals are usually affected?**

There are certain breeds which are predisposed to heart disease, and therefore will be more prone to forming a thromboembolism. These are the Maine Coone, Ragdoll and Norwegian Forest Cats. However any cat can suffer from heart disease and so the condition can occur in any breed.

It is more common in younger animals (average age 4-10yr old) and male cats do seem to be slightly more likely to suffer from the condition for some reason.

**Can a clot go anywhere else dangerous?**

Yes it can. Sometime when the clot leaves the heart it can affect one of the front legs and so you get similar symptoms but with a front leg affected rather than a back leg/legs. For anatomical reasons if a front leg is affected it is usually the RIGHT leg.

Emboliisms can also affect the lungs (which can cause sudden death) the brain (which can cause stroke like symptoms) or other organs such as kidneys, guts etc. These locations are encountered far less frequently than the back legs as described above.