FibroCartilagenous Embolism (FCE)

To understand FCE, you have to understand anatomy of the spine. The vertebral column (spine) consists of numerous small back bones called vertebrae that are linked together by joints containing intervertebral disks. The disks are similar to the joints that connect arm or leg bones together in many ways. They allow flexibility between the back bones, so that you can arch or twist your back as needed, just as you can flex and extend a knee or elbow.

A joint in the limb, say a knee or elbow, has a capsule which secretes a lubricating fluid. The bones are capped with smooth cartilage to facilitate frictionless gliding as the surfaces move during flexion and extension. The disk is nothing like this. It is more like a cushion between the end plates of the many back bones. It is round (hence the name disk) and fibrous on the outside with a soft gelatinous inside to absorb the forces to which the bones are exposed. This jelly-like inside material inside is called the nucleus pulposus. The spine provides a bony protective case around the vulnerable spinal cord. The spinal cord is the cable of nerve connections that transmits messages to and from the brain and controls the motion and reflexes of the body. The spinal cord is fed by a network of spinal arteries. In FCE, the material from the nucleus pulposus breaks off and enters the arterial system and is carried to the spinal cord where it causes a blood vessel obstruction: an embolism. This area of the spinal cord loses blood supply and may actually die.

Symptoms

Imagine your dog is happily playing in the yard, jumps up to catch a ball, lands badly, and comes up not just lame but weak or even paralyzed in a back leg. The toes knuckle under, perhaps. Maybe his back tilts downward, his rear legs are too weak to rise all the way up. You check him over, trying to find where it hurts and it simply does not seem to hurt at all. There are many conditions that might fit here but the neurologic knuckling and the absence of a tender spot suggests a fibrocartilaginous embolism (FCE).

The process may be painful at first, but there is usually very little pain within 24 hours. With FCE, complete recovery is far from guaranteed. The good news is that after the first 24 hours, the condition is not going to get worse, and often begins to get better soon after that.

Any dog can be a victim of FCE though about half of the victims are giant breed dogs. Breeds that are called chondrodystrophic (meaning they are dwarf-like and have short legs) tend to calcify their disk material, making it too hard to participate in an FCE and they are thus at lower risk. Such lower risk breeds include Basset hounds, Dachshunds, Shih tsus and other short legged breeds. Instead, these dwarf breeds tend to get a different spinal problem called Degenerative Disk Disease, which is often amenable to surgery. Some feel the Miniature Schnauzer has higher risk for FCE as this breed tends to circulate excess blood fats and cholesterol that may predispose to embolism. Most FCE dogs are young adults between the ages of 3 and 6 years. In one study, 61% were evaluated after some kind exercise injury or trauma. There is about a 50:50 chance that the lumbar area of the spinal cord will be affected, which means only the rear legs will be involved. Because the embolism is not generally a symmetrical event, both left and right may not be equally affected.

Diagnosis

With disk disease, abnormalities may be seen on x-rays of the spine, whereas in FCE the radiographs will appear normal. A myelogram involves general anesthesia and injecting dye in the space around the spinal cord. If there is an area of compression due to disk disease, it will be visible on the myelogram and the patient can then proceed to surgery. In FCE, the myelogram is normal. If MRI is done by a specialist, signs of FCE can be seen on that test. When there is no access to MRI, diagnosis of FCE is made based on the clinical picture of a patient in the appropriate age group with an acute spinal deficit, no abnormalities on x-rays and no painful areas. Symptoms much worse on one side that the other is also a strong clue to FCE.

Treatment

Physical therapy for pets is an emerging field of veterinary medicine that can be very helpful in maximizing mobility after FCE and many spinal cord and orthopedic conditions. If you need help finding a physical therapist in your area, ask your veterinarian for help.

Cavaletti poles. Photo courtesy of California Animal Rehabilitation.

A dog uses an underwater treadmill for rehabilitation. Photo by Karen James.

Theraband walk. Photo courtesy of California Animal Rehabilitation.

Interferential stimulus. Photo courtesy of California Animal Rehabilitation.

Prognosis

Recovery depends on how much loss of function there is. About 74% of dogs in one study showed some improvement ultimately, but be prepared for no improvement and ask yourself what kind of care will be needed and how easily it will be to manage your dog if he or she remains paralyzed. Maximum improvement has generally occurred by 3 weeks after the time of the injury, with some dogs showing some additional slow improvement over months, especially if there is a physical therapy program. FCE is unlikely to be a recurrent condition so that if a dog has one episode, he or she is not likely to experience another.

References:

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