

Fibrocartilaginous Embolism

ABOUT THE DIAGNOSIS

Fibrocartilaginous embolism (FCE), also called fibrocartilaginous embolic myelopathy, is a sudden paralytic condition of the spinal cord of dogs. It is rare in cats. It occurs with no prior warning and causes paralysis of the hind legs and sometimes of the forelegs as well. The paralysis is partially or totally reversible with time in most cases with good nursing care in the hospital or at home for a period of weeks.

In animals, as in people, the vertebral column (spine) is the part of the skeleton that extends from the skull to the pelvis. Along its entire length, the structure of the vertebral column is like a two-tiered bridge. The upper level of the bridge contains the spinal cord, made up of sensitive nerve fibers that carry information between the brain and the rest of the body, especially the limbs. The lower level is made up mainly of bone (vertebral bodies) that are connected to each other by cartilaginous shock absorbers called the intervertebral discs. These discs contain a gel-like center that is normally very flexible, and a more firm outer shell.

With FCE, a small amount of intervertebral disc material detaches spontaneously and lodges in a nearby blood vessel, blocking the blood supply to the adjacent region of spinal cord. This is different from a “slipped disc,” or intervertebral disc disease, where the disc bulges upward (from the lower deck to impinge on the upper deck of the bridge) and presses on the spinal cord; with intervertebral disc disease, an operation that removes the pressure of the bulging (“prolapsed”) disc disease can be curative, but with FCE, there is no benefit to be had from any surgery because damage comes from the blockage of multiple small blood vessels, or “embolization” of blood vessels. This blocked blood supply causes inflammation and nerve damage of spinal cord issue, leading to weakness, incoordination (ataxia) or, often, sudden paralysis. The exact trigger or cause of FCE is not clearly understood. Large breed dogs, as well as Shetland sheepdogs and miniature schnauzers, seem to be more prone to FCE than other breeds. It can occur at any age.

This condition occurs suddenly and is sometimes preceded by an episode of physical exertion. Typically, owners of dogs that had FCE report that their dog was playing outside, yelped once, and either was unable to use the hindlimbs (back legs) or fell over, unable to rise. Initially there may be some signs of pain in some cases, but when present, pain usually resolves in a matter of minutes or hours. Symptoms develop immediately or in the first few hours, and then the condition almost never worsens after the first day.

Symptoms depend on the severity and the location of the spinal cord injury. A lesion in the cervical (neck) area of the spinal cord will affect both front and hindlimbs. If the embolism is in the thoracic (ribcage) or lumbar (lower back) sections of the spinal cord, only the hindlimbs will be affected. In mild cases, where the spinal cord is not severely damaged, the dog may appear weak or unbalanced and walk in a clumsy or “drunk” manner (**ataxia**), with the legs tripping on each other but without complete paralysis. In more severe cases, the animal may be partially or completely paralyzed, although consciousness and alertness are always preserved, even when there is no movement of all four limbs. This is an important characteristic that distinguishes collapse due to FCE from other causes of collapse, such as seizures or syncope (fainting). With FCE, there also may be loss of bladder control and loss of pain sensation. Often, the symptoms are asymmetric, or one-sided.

The clot of disc material can lodge on the left or right side of the spinal cord, sometimes affecting only one leg. To summarize, typical FCE is an **acute, nonpainful, asymmetric, and nonprogressive** (deteriorates very little or not at all after it first appears) condition.

There are many different types of spinal disorders of dogs, any of which can mimic FCE in terms of symptoms. However, spinal cord problems that are not FCE can carry a very different outlook, and may require treatments that are very different. Therefore, it is essential to be sure that FCE is the cause of symptoms and not something else. To determine a diagnosis of FCE and to identify its exact location in the spinal cord, your veterinarian will begin by asking you several questions, which can provide vital information. Did you witness the onset of the symptoms? If so, what did you see, and how did it evolve (did things get better or worse)? Did you see other changes beforehand that in hindsight may be significant—changes in behavior, activity, appetite, and so on? Is your dog taking any medications? This type of information can help tremendously. Your veterinarian should also perform a complete physical exam to identify the extent of the symptoms. A specific neurologic exam is also important since it will help your veterinarian discern the location and severity of the problem. During this examination your veterinarian will observe your pet’s mental status and gait (way of walking) to rule out disorders involving the brain. He or she will test the balance and sensation in all four limbs and will palpate the spine to localize back pain. To test for pain sensation in the limbs, the toes are pinched. Your dog may pull back her leg as a **reflex** but should also react (turn the head or cry out) if a pain **response** is present. Withdrawing the limb does not mean that your dog can feel pain; it is only a normal reflex that occurs without conscious perception. This is an important prognostic indicator (see below), meaning that the presence or absence of pain sensation is a major factor that helps determine how well dogs are likely to recover.

FCE is generally a diagnosis of exclusion. This means that it is important to perform tests to rule out (meaning to prove the absence of) other spinal cord diseases that can produce the exact same symptoms. They include:

- **Blood work**—usually normal in FCE cases, but may be abnormal with other spinal cord diseases.
- **Radiographs** (x-rays)—also usually normal in FCE cases, but may be abnormal with certain vertebral tumors, fractures, foreign body trauma, and other vertebral structural abnormalities.
- **Myelogram**—a special x-ray series taken under general anesthesia, with dye injected to show the spinal cord. With FCE, a myelogram can show mild swelling of the spinal cord or may be normal. By contrast, intervertebral disc disease and spinal cord tumors almost always produce abnormalities that are apparent on the myelogram (or CT scan or MRI scan; see below).
- **CSF tap**—while the dog is under anesthesia, a sample of CSF (cerebrospinal fluid) is collected, which can reveal signs of mild, noninfectious inflammation with FCE or various other abnormalities with other spinal cord disorders.
- **CT scan or MRI**—advanced scans also requiring general anesthesia. These carry the same advantages as a myelogram but can provide much more detailed information, and are less invasive.

These tests, and a second opinion, may be the basis for referral to a veterinary neurologist (directory: www.acvim.org [North

America], www.ecvim-ca.org [Europe]), and you can discuss whether seeing one of these specialists would be appropriate by bringing this question up with your veterinarian.

LIVING WITH THE DIAGNOSIS

Having your pet suddenly become paralyzed can be devastating. The good news is that most dogs afflicted with FCE recover most or all of their limb functions, although this can take weeks. The degree of recovery also depends on where the lesion is (which region of the spinal cord) and how severe it is. Each case is different, and your veterinarian will be able to form a prognosis—meaning to get an idea of the outlook for improvement and recovery—based on the tests and neurologic examination. Unfortunately, dogs that have lost pain sensation to the limbs have a lesser chance of recovery than dogs with intact pain sensation, and this explains the importance of checking for pain perception during the neurologic examination.

You may be faced with the possibility that your dog's injury will result in temporary or permanent loss of nerve/muscle function. This can include weakness or paralysis of the hindlimbs or all four limbs and loss of bladder control. As mentioned, the symptoms stabilize within the first day. Often, minimal or no improvement is seen for the next 5 to 14 days. After this, gradual improvement can occur over a period of 6 to 12 weeks. Some dogs continue to recover for 6 months or longer.

If your dog remains paralyzed in one leg or both hindlimbs, it does not mean that he/she cannot lead a happy life. Therefore, this possibility should not discourage treatment at the outset. However, caring for a dog that cannot walk can be very demanding. It is worth discussing with your veterinarian what a realistic expected outlook is. These discussions should be updated with recheck examinations during the weeks that follow the moment FCE first happened. In this way, a pattern of progression can be observed, and some idea of an accurate long-term expectation can be reached. Most dogs show some degree of improvement. However, if your dog is a larger, heavier breed; is paralyzed in all four limbs; or if you cannot commit to the home care required by a paralyzed dog, you may decide that euthanasia is the most humane choice for your pet.

TREATMENT

There is no cure for FCE. Therefore, the intensity of treatment varies according to the severity of the injury but is generally based on supportive care such as physical rehabilitation, pain control (only in cases with signs of pain—first 12 to 24 hours), and basic hygiene to help with cleanliness involving urination and defecation.

Antiinflammatory medication may be helpful if given soon after clinical signs appear (within the first 8 hours). In the first moments when symptoms are apparent, it is important to restrict your dog's activity until a diagnosis is made. Strict cage rest is recommended because some cases may worsen if the dog continues to be active before being examined by a veterinarian. It is commonly necessary to hospitalize your dog for the first several days so that repeated neurologic exams can be performed and FCE confirmed by doing tests that exclude the other spinal cord disorders that are impostors for FCE.

There is no surgical treatment for fibrocartilagenous embolism.

Other types of treatment are also being recognized. **Acupuncture** may help the spinal cord to heal. **Physical rehabilitation** is also beneficial in many cases of FCE. Exercises, massage, and stretching may be performed in special clinics or at home, with careful instruction and direction from your veterinarian.

Home care is a very important part of recovery. Helping a paralyzed dog to recover includes:

- Turning him/her regularly to avoid bedsores and providing soft, dry, clean bedding at all times.
- Stretching and range of motion exercises to help keep the legs limber.
- Sometimes, if possible, swimming in a bathtub or pool to help strengthen limbs. Being in a pool or deep tub requires extreme attention and often more than one person to help, since dogs with compromised limb function or paralysis need constant, extensive support to keep afloat, and improper handling can be catastrophic (drowning).
- Carrying outside to urinate and defecate.
- Expressing the bladder. Some dogs are unable to urinate on their own. You may have to squeeze the belly gently to help empty the bladder several times per day. If this is necessary, you should ask your veterinarian to show you the proper way to do this.

DOs

- Follow your veterinarian's instructions regarding recheck appointments, home care, and physiotherapy.
- Enforce strict cage rest if advised by your veterinarian.
- Keep your dog clean and dry. If he/she has lost bladder control, you will need to give frequent baths and provide fresh bedding. Trimming the hair around the hind end also will help prevent painful rashes (urine scald) in females especially.

DON'Ts

- In any dog, do not ignore changes such as limping/lameness, loss of balance, or a change in gait (way of walking). These signs could be the first indicators of FCE or of other spinal disorders that require urgent treatment.

WHEN TO CALL YOUR VETERINARIAN

- The symptoms should not worsen. That is, once FCE has been confirmed, you should see your dog's ability to move the legs slowly improve over time. If you notice your dog's ability to move is worsening over hours to days rather than improving, call your veterinarian.
- Essential functions like comfortable breathing, a good appetite, an alert disposition, and so on should not be affected by FCE. If you find any of these body functions to become abnormal during the recovery period, contact your veterinarian to be sure that a complication is not setting in.
- For a dog that is being cared for at home, contact your veterinarian if you are unable to follow the instructions provided.

SIGNS TO WATCH FOR

As signs suggesting the first occurrence of FCE:

- Sudden paralysis, without pain.
- Change in gait, or lameness, dragging toes, often one-sided.
- As signs suggesting that a dog with confirmed FCE may be experiencing complications: see above.

ROUTINE FOLLOW-UP

- Some dogs make a full recovery quickly, but most cases require long-term home care involving physical rehabilitation and home nursing care. FCE is a condition that often requires a large commitment from the owner, with rechecks depending on the rate of improvement and presence or absence of complications.

ADDITIONAL INFORMATION

- Other diseases can present with similar or identical symptoms. Therefore it is important to rule them out (make sure they are

not actually present) before diagnosing FCE. These include intervertebral disc disease (IVDD), meningitis, tumors of the spine, fractures of the spine, or other orthopedic problems such as torn cruciate (knee) ligaments. Most of these conditions are recurrently painful, whereas FCE is not.

- Many dogs with FCE recover most or all of the function of the legs and, when affected, the bladder as well. Some dogs who have permanent neurologic deficits or paralysis can still lead happy normal lives. Long-term care means a commitment of time, expense, and emotion from a dedicated owner and is not necessarily feasible for everyone.

Other information that may be useful: "How-To" Client Education Sheets:

- How to Assist a Pet That Is Unable to Rise and Walk
- How to Perform Range of Motion Exercises

Practice Stamp or Name & Address