

Degenerative Disk Disease in Dogs

The spinal cord is one of the most important and most sensitive organs in the body. If it is traumatized, its cells will not regenerate; injuries usually result in permanent damage. Therefore, the spinal cord is protected in a very special fashion. It goes through a bony canal within the spine where it is surrounded by protective bone everywhere except over the disks. This extreme protection reflects its importance and its fragility.

Disks are rubber-like cushions between the vertebrae. They allow the back to move up and down and sideways without allowing contact between the bones of the spinal column.

Contributing Factors

Most owners report that a disk rupture occurred following a traumatic event, such as a relatively small jump or fall. Although this act is frequently blamed for the disk rupture, if the disk had not already been degenerating, the rupture would not have occurred.

Prevalence

Most dogs with degenerative disk disease are 3-7 years old. It is most often considered to be a spontaneous event that is most likely controlled by genetic factors. Certain breeds, notably the Dachshund, Poodle, Pekingese, Lhaso Apso, and Cocker Spaniel, have a high incidence of disk disease. Large breeds, such as the German Shepherd, Labrador Retriever, and Doberman Pinscher, also have disk disease.

Causes/Transmission

The disk is composed of two parts. The outer covering is much like a thick shell. It is comprised of tough fibers that protect and contain the central part. It is thinnest at the top; this thin area is located just below the spinal cord. The central part of the disk has the consistency of thick toothpaste and is much softer than the outer part.

When the outer shell degenerates, it allows the central part of the disk to escape. This is called a disk rupture or a ruptured disk. Since the shell is thinnest near the spinal cord, disk material that escapes almost always goes upward, putting pressure on the cord. Because the spinal cord is encased within its bony canal, it cannot move away from the pressure and it becomes pinched or compressed.

Clinical Signs

The spinal cord is much like a telephone cable that is carrying thousands of tiny wires. When it is crushed, transmission of information through the wires is stopped. When the disk degenerates and ruptures, a similar event occurs. The central part is forced upward, putting pressure on the spinal cord and/or the nerves that leave the spinal cord over the disks (i.e., spinal nerves). Pressure on the spinal nerves results in pain; pressure on the spinal cord results in pain and/or loss of information transmission. This results in paralysis or partial paralysis.

Most disk ruptures occur in the middle to lower part of the back. However, they may also occur in the neck. The former often causes paralysis without severe pain; the latter often causes severe pain without paralysis.

Disk degeneration usually occurs relatively slowly, i.e., over several days or weeks. The dog usually experiences pain and becomes reluctant to move. It may lie around for a few days allowing the body to resolve the problem, often without the owner being aware that a problem existed. However, disks may also rupture very acutely. Some dogs will go from normal walking to total paralysis in less than one hour.

Diagnosis

A presumptive diagnosis of disk disease is made based on the dog's history of neck or back pain, incoordination when walking, or paralysis when there is no history of trauma. The physical examination will indicate that the problem originates from the spinal cord, giving further evidence to disk disease. Another important factor is the breed. If the dog is one of the high incidence breeds, the diagnosis is even more likely.

In most cases, plain radiographs (x-rays) may be normal since neither the disk nor the spinal cord are visible. For this reason a myelogram will be done. This procedure involves injecting a special dye around the spinal cord. When radiographs are taken, the dye will be seen outlining the spinal cord. A break or disruption in the continuity of the dye column means that there is pressure on the spinal cord. A myelogram is performed with the dog under general anesthesia.

It is possible that the pressure is due to a blood clot or a tumor. Both are possible but not very common, especially when compared to the frequency of disk ruptures. If the breed of dog is correct for disk disease, there has been a sudden onset, and there has been no trauma, there is about a 95% chance that a disk rupture is causing the pressure. However, the diagnosis is not definite until the time of surgery.

Treatment

Treatment is based on the stage of the disease. **Stage I** disk disease produces mild pain and is usually self-correcting in a few days. **Stage II** disk disease causes moderate to severe pain in the neck or lumbar (lower back) area. **Stage III** disk disease causes partial paralysis (paresis) and results in the dog walking in staggering or uncoordinated movements. **Stage IV** disk disease causes paralysis but the ability to feel is present. **Stage V** disk disease causes paralysis and loss of feeling. These stages tend to overlap in some dogs, and dogs may move from one stage to another over a period of hours to days.

Dogs with **Stage II** disease are usually treated with anti-inflammatory drugs, pain relievers, muscle relaxants and restriction from exercise. Surgery may be considered if the neurological status declines. It is important that the dog be confined to a crate or cage during treatment. The length of confinement will vary among different dogs.

Dogs with **Stage III, IV and V** disease should have surgery, and the sooner that surgery is performed the better the prognosis.

The goal of surgery is to remove pressure from the spinal cord. If the disk rupture occurs in the lower back, a window is made in the side of the vertebral bone to expose the spinal cord. This window allows removal of disk material and relieves pressure from the cord. If the disk rupture occurs in the neck, a window is made in the bone exposing the spinal cord. This may be done either from the top or the bottom, depending on the situation and the training of the surgeon.

Following surgery, your dog will be hospitalized for several days. Bladder and bowel control are often lost when the dog is paralyzed, so it is best for control of these functions to return before going home. The surgeon performing the surgery will discuss with you when you can expect to take your dog home and what care will be needed once home.

Hospital Discharge

If paralysis was present before surgery, your dog may not be able to walk when it is discharged from the hospital. You will be given detailed instructions on the procedures that should be performed. Recovery is dependent on several factors: whether or not permanent damage was done before surgery, if the surgery was performed promptly, physical therapy performed at home, and the motivation of your dog. You will be instructed on ways to achieve the last two.

Prognosis

The return of walking ability may not occur for several days, or even weeks, so success can not be determined immediately.

Other Diagnostic Considerations

The purpose of the myelogram is to identify pressure on the spinal cord. If the myelogram is normal, there is no pressure on the spinal cord. This has several important implications. First, it means that surgery will generally not be appropriate because the purpose of surgery is to relieve the pressure from the cord. Second, it means that one of the following conditions is likely to exist.

1. Spinal Shock. This is a temporary loss of spinal function that is generally associated with trauma. It occurs suddenly and is somewhat like a concussion of the brain. It may leave permanent damage, or full recovery may occur. Recovery from spinal shock generally occurs within a few hours to a few days.

2. Fibrocartilaginous Infarct or Embolism (FCE). In this condition, a small amount of disk material ruptures and gets into one of the blood vessels leading to the spinal cord. As the vessel narrows, the disk material obstructs it, depriving a certain segment of the spinal cord of its blood supply. Without proper blood supply, that segment of the spinal cord quits working, resulting in paralysis. Surgery will not help these dogs because there is no pressure on the spinal cord. Often, paralysis involves only one rear leg, or one rear leg is more severely affected than the other. Complete recovery may occur in a few days to weeks, or there may be permanent damage to a portion of the spinal cord.

Diagnosis of fibrocartilaginous infarct/embolism is based on the correct clinical signs and a normal myelogram. Confirmation requires a biopsy of the spinal cord so the diagnosis is confirmed only with an autopsy.

3. Degenerative Myelopathy. This condition means that the spinal cord is slowly dying. It results in progressive paralysis that begins with the dog dragging its rear feet as it walks. This is called “knuckling over” and results in the toenails of the rear feet being worn because they drag the ground with each step. It progresses to weakness of the rear legs, then paralysis. It generally takes several weeks before paralysis occurs, and it generally occurs in large breeds of dogs, especially German Shepherds. Because there is no successful treatment and paralysis includes loss of urine and bowel control, euthanasia is generally recommended.

Diagnosis of degenerative myelopathy is based on the correct clinical signs, especially in a large breed of dog, and a normal myelogram. Confirmation requires a biopsy of the spinal cord so the diagnosis is confirmed only with an autopsy.