Spinal Cord Disorders

Weakness and incoordination are the most common clinical signs resulting from problems affecting your pet’s spinal cord. In severe cases, your pet may actually become paralyzed and lose control of its urinary bladder. Before we can determine the exact cause of the signs (i.e. the diagnosis), we must perform a neurological exam in order to establish what is referred to as the “neurological localization”. On the basis of the neurological examination your dog or cat’s problem will “localize” to one of the four following areas of the spinal cord:

- The first thru fifth cervical spinal cord area or “C1-C5”
- The sixth cervical thru second thoracic spinal cord area or “C6-T2”
- The third thoracic thru third lumbar area or “T3-L3”
- The fourth lumbar thru third sacral area or “L4-S3”

Based on where the problem localizes in the spinal cord above, a list of diseases (the so called list of “differential diagnoses”) is then generated, which includes the most likely disease conditions to be affecting your pet’s spinal cord.

The “differential diagnoses” for any given patient can be shortened considerably if some basic information is taken into account, such as:

- The patient’s age and breed
- Whether the condition came on suddenly or slowly
- Whether the condition is progressing or static
- Whether or not discomfort is present
- Where the spinal cord problem localizes

Below, the four primary spinal cord localizations are considered individually because specific diseases will affect each region.
Spinal Cord Segments “C1–C5”

Problems affecting spinal cord segments C1-5 may be associated with variable degrees of neck pain, weakness and incoordination in all four limbs, and in severe cases an inability to stand.

In mature dogs, intervertebral disc disease (“IVDD”) and autoimmune inflammation of the spinal cord (“autoimmune meningoencephalitis”) are the most common conditions affecting this region. In dogs less than two years of age, congenital anomalies (e.g., atlanto-axial subluxation; a spinal cord cavity referred to as “syringohydromyelia”), infectious and autoimmune inflammation of the spinal cord, discospondylitis (infection of the bones of the spine), and trauma are the most likely causes. Tumors (benign or malignant) of the spine or spinal cord can occur in dogs of any age. The most common tumors affecting the cervical spinal cord are meningiomas and nerve sheath tumors; both are more common in older dogs.

Some dogs with cervical malformation-malarticulation (aka “Wobbler”) syndrome have neurological signs with a C1–5 pattern of dysfunction, although the abnormality is often located further down the cervical spine. Sudden onset, non-painful, non-progressive neurologic deficits usually result from a spinal cord stroke or “fibrocartilaginous embolism” (FCE). Signs with FCE often are asymmetrical and range from mild to severe.

In cats, clinical disc disease is rare in the neck. The likely diagnoses are trauma, cancer (usually lymphoma) and inflammatory diseases, particularly feline infectious peritonitis (FIP).
MRI of the neck of an 8-year-old mixed breed dog with slowly progressive weakness and incoordination affecting all four limbs. The arrows point to a cancer called a nerve sheath tumor growing in the 3rd cervical nerve and also compressing the spinal cord. The cancer was treated with surgery and radiation therapy.

**Spinal Cord Segments “C6–T2”**

Similar to C1-6 problems, diseases affecting spinal cord segments C6-T2 may be associated with variable degrees of neck pain, weakness and incoordination in all four limbs, and in severe cases an inability to stand.

Similar considerations apply here to those causing C1–C6 signs listed above, especially intervertebral disc disease and autoimmune meningomyelitis.

Cervical malformation-malarticulation (Wobbler) syndrome or disc herniations are most prevalent in the caudal cervical spine of large dogs such as Dobermans, Labrador Retrievers, and Great Danes. Fibrocartilagenous embolisms also occurs with some frequency in this region.
MRI of the cervico-thoracic junction of an 8-year-old Boston Terrier with autoimmune meningitis (arrows) that had presented for pain, weakness and incoordination in all four limbs. The patients with treated with aggressive medical therapies to suppress the abnormal immune attack and made a complete recovery.

**Spinal Cord Segments “T3–L3”**

Problems affecting spinal cord segments T3-L3 may be associated with variable degrees of back pain, weakness and incoordination in the back legs, and in severe cases complete paralysis of the back legs and urinary incontinence.

Problems in this region account for most cases of spinal cord disease and disc herniation is the most likely diagnosis in dogs older than one year. In younger dogs, autoimmune meningomyelitis, discospondylitis, and trauma are common. In cats, disc disease is uncommon but does occur, particularly in aged animals. Trauma, cancer and inflammation are the most likely causes of feline “T3-L3” spinal cord disease.

In large breed (especially German Shepherds and Boxers), older dogs with non-painful, slowly progressive weakness and incoordination in the back legs, a common diagnosis is degenerative myelopathy. Chronic disc herniations, spinal tumors and discospondylitis must be eliminated before this diagnosis is reached. In young animals like Pugs and Bulldogs, congenital defects of the vertebrae or spinal cord are likely.
MRI of a 12-year-old Beagle with pain and weakness caused by multiple intervertebral disc herniation causing mild-moderate spinal cord compression at T11-12, T12-T13, and T13-L1 (arrows). The patient was managed conservatively with strict rest, anti-inflammatories and pain medications and had a great recovery.

**Spinal Cord Segments “L4–S3”**

Problems affecting spinal cord segments L4-S3 may be associated with variable degrees of lower back pain, weakness in the back legs, and in some cases loss of urinary and fecal continence.

Problems in this area are commonly slowly progressive, but occasionally may come on suddenly. Lumbosacral stenosis (aka “lumbosacral disease” or “cauda equina syndrome”) is common in large breeds of dog. Cancer or discospondylitis also may occur in this area. Fibrocartilagenous embolisms are also seen here. In young animals, congenital defects of the vertebrae or spinal cord are common in this area.

With problems in the sacral area, signs referable to the bladder, perineum, and even back leg weakness may be seen.
MRI of a 10-year-old Labrador Retriever with lower back pain and weakness of the back legs caused by “lumbosacral stenosis”. The arrows show a herniated disc that is compressing the nerve roots of the cauda equina. This patient was taken to surgery and had a complete recovery.

SUMMARY

Typically patients are presented to the neurologist with a spinal cord problem that could be explained by any one of several different disease processes. Taking your pet’s breed, age and brain “neurological localization” into account allows us to narrow the differential diagnosis. Once the list of differential diagnoses have been generated, we strive to keep an open mind at the same time as we try to rule out each potential diagnosis in a step-wise fashion to reach a definitive diagnosis. For the majority of pets an MRI (or occasionally a CT scan or myelogram) and/or cerebrospinal fluid collection and analysis are required for us to make the definitive diagnosis. For example, MRI may clearly demonstrate an intervertebral disc herniation or a spinal cord stroke. Once the definitive diagnosis has been made, we can develop treatment options that may include medical, radiation or surgical therapies, or combinations thereof. The definitive diagnosis also allows us to provide you with our best estimate of your pet’s prognosis, which is generally based on how patients typically respond when treated with palliative or more aggressive treatment protocols.