

DIFFERENTIAL DIAGNOSIS OF SPINAL DISEASES

Ronaldo Casimiro da Costa, DMV, MSc, PhD, Dipl. ACVIM - Neurology
College of Veterinary Medicine, The Ohio State University
Columbus, OH

When approaching a case with spinal problems, the simplest approach, once the lesion is localized, is to consider differential diagnoses using the acronym lists based on pathophysiologic mechanisms. These acronyms are called either VITAMIN-D or DAMNIT-V and are very useful and practical ways to approach neurological diseases.

When using this acronym, it is useful to consider the signalment and history to develop appropriate differential diagnoses for the patient. For example, even though intervertebral disc disease is the most common spinal disease of dogs, it is not a reasonable differential diagnosis for a 6-month old dog with chronic paraparesis. Some generalities should be considered when using the VITAMIN-D acronym. Young dogs are more likely to have congenital or inflammatory conditions. Acute presentations are usually caused by vascular or traumatic conditions. Chronic presentations are usually seen with degenerative or neoplastic processes. Another way to approach patients with spinal diseases is to develop a list of diseases that are known to affect specific spinal regions. This is useful because although many diseases affect several spinal regions (e.g. intervertebral disc disease, discospondylitis, fibrocartilagenous embolic myelopathy), many are region specific (e.g. atlantoaxial instability, cervical spondylomyelopathy, degenerative myelopathy in the earlier phases).

Once the list of differential diagnoses is prepared for the patient, the most probable causes should be ruled-in or ruled-out based on appropriate diagnostic tests. It is recommended to always perform survey radiographs (always obtaining orthogonal views). If nothing is found on radiographs, then magnetic resonance imaging, computed tomography, myelography or cerebrospinal fluid should be used to rule-in or out the differential diagnoses.

Differentials according to specific regions

C1 - C5 spinal cord segments / C1 – mid C5 vertebrae

Common diseases affecting the C1-5 spinal cord segments in small breeds are atlantoaxial subluxation and cervical intervertebral disc disease. Spinal pain is often present with these diseases. Primary differentials for large breed dogs with C1 to C5 lesions are intervertebral disc disease (IVDD), cervical spondylomyelopathy, and spinal neoplasia, mainly meningiomas. Trauma is also common and affects both small and large breeds. Cervical pain without neurological deficits affecting the C1 to C5 regions is usually caused by steroid responsive meningitis-arteritis, cervical intervertebral disc disease, or discospondylitis.

C6-T2 spinal cord segments (cervical enlargement) / vertebrae C5 to T1.

Frequent conditions seen at this region are cervical intervertebral disc disease in large and small breed dogs, and cervical spondylomyelopathy in large and giant breed dogs. Neoplasia,

discospondylitis, osteomyelitis, trauma, and fibrocartilaginous embolic myelopathy can also occur in this region.

T3-L3 spinal cord segments / T2 – L3 vertebrae

Most spinal diseases in dogs and cats affect the T3-L3 spinal segments. Intervertebral disc disease (either extrusion or protrusion) is very common in this location. Other common diseases are degenerative myelopathy, spinal trauma, neoplasia, and fibrocartilaginous embolic myelopathy. If the lesion is localized to the mid to cranial thoracic region, between T2 to T10 vertebrae (based on the cut-off of the cutaneous trunci reflex and/or spinal pain), then a few diseases can be considered more likely. It is important to know that IVDD is rare at this region. The diseases that are more commonly seen between T2-T10 are spinal neoplasia, discospondylitis, and hemivertebra.

L4-S3 spinal cord segments (lumbosacral enlargement) / L4 - L5 vertebrae (dogs)

This is a small spinal cord region, and most diseases affecting the T3-L3 spinal cord region can also affect this region (e.g. IVDD, trauma, neoplasia). A disease that frequently affects this specific region is fibrocartilaginous embolic myelopathy.

L6-L7 vertebrae and sacrum in dogs

Problems affecting the caudal lumbar region are very common in large breed dogs. Spinal diseases affecting this region can appear similar to musculoskeletal disorders, as lameness may be the only clinical sign. It is very important to know that degenerative lumbosacral disease (cauda equina syndrome) in dogs will NOT cause paralysis (paraplegia) as the femoral nerve emerges before the L7-S1 vertebral region. The primary differential diagnoses for diseases affecting this region are degenerative lumbosacral stenosis, discospondylitis, neoplasia and extradural synovial cysts. Spinal pain is often a consistent feature of diseases affecting the caudal lumbar/lumbosacral spine.

A step-wise process facilitates the diagnostic approach to patients with spinal disorders. The VITAMIN-D system can be used to select the primary pathophysiologic mechanisms causing the patient's clinical signs. Using the acronym VITAMIN-D, the clinician may be able to go from a large list of diagnostic possibilities, to a shorter list of diagnostic probabilities.