

A PAIN IN THE NECK: DIAGNOSING AND TREATING NECK AND BACK PAIN IN SMALL ANIMALS

Christopher L. Mariani, DVM, PhD, DACVIM (Neurology)
North Carolina State University, Raleigh, NC 27607

Neck and back pain are common presenting complaints in veterinary medicine and occur in animals with a variety of signalments. Animals may present with a chronic history of lower-grade discomfort, although acute presentations of moderate to severe pain are common and extremely distressing to owner and pet alike. Pain may originate from a variety of locations associated with the spine, including vertebrae, nerve roots, meninges and possibly the intervertebral disk. A variety of etiologies are possible, although most patients fit within “the big 5” causes listed below.

Neck and Back Pain: The Big Five

- 1) Intervertebral disk disease (IVDD)
- 2) Diskospondylitis
- 3) Meningitis and meningomyelitis
- 4) Trauma
- 5) Neoplasia

Neck and Back Pain: Other Etiologies

- 6) Lumbosacral disease (LSD)
- 7) Caudal cervical spondylomyelopathy (CCSM, “Wobbler’s” syndrome)
- 8) Atlantoaxial subluxation (AAS)
- 9) Chiari-like malformation (Caudal occipital malformation syndrome [COMS])
- 10) Space-occupying intracranial disease (e.g., Brain tumor)
- 11) Polyarthritis (very rare cause of neck or back pain)
- 12) Polymyositis (very rare cause of neck or back pain)

DIAGNOSTIC CONSIDERATIONS FOR PATIENTS WITH SPINAL PAIN

The diagnosis of the cause underlying neck and back pain revolves around imaging of the spine, spinal cord and associated structures. Survey radiographs of the affected area are almost always the best starting point. Routine blood testing (i.e., CBC and serum chemistries) and urinalysis is uninformative in most patients with spinal pain, with exceptions being those with underlying infectious etiologies (e.g., diskospondylitis or infectious meningoencephalitis) or systemic inflammatory conditions (e.g., steroid-responsive meningitis-arteritis [SRMA]).

Survey radiographs are diagnostic in most cases of diskospondylitis, revealing lysis and malformation of the vertebral endplates next to the affected disk space. Bacterial culture of the urine and blood and serum titers for infectious organisms (e.g., *Brucella canis*, *Aspergillus spp.*) may help to determine the offending organism and site of origin. Examination of urine sediment may reveal fungal hyphae in some *Aspergillus* infections. Spinal trauma is rarely a diagnostic challenge, and fractures and luxations of the spine are usually seen with plain radiographs, although the changes may be subtle in some cases. Discovery of diskospondylitis or spinal trauma should initiate radiographic examination of the entire spine, as multiple lesions are often seen. Atlantoaxial subluxation is often obvious, demonstrated by an increased distance between the dorsal arch of C1 and the dorsal spinous process of C2. Occasionally radiographs taken

with the neck in **mild** flexion may facilitate the diagnosis, but should be obtained with **extreme caution** (particularly in anesthetized animals) to avoid further spinal cord damage. The dens (odontoid process) is often hypoplastic or absent in these animals, a finding which can also facilitate diagnosis. Neoplasms involving the bone may show lytic or proliferative changes on survey radiographs if a sufficient portion of the bone is involved. Animals with IVDD often show typical changes on radiographs, including calcified disks *in situ*, narrowed intervertebral disk spaces and radiodense material overlying the intervertebral foramen, although definitive diagnosis usually requires additional imaging techniques.

Additional diagnostic imaging techniques applicable to spinal disease include computed tomography (CT), magnetic resonance imaging (MRI) or less commonly contrast studies (e.g., myelography, epidurography) or nuclear scintigraphy. CT is much more sensitive than survey radiography and may show obvious evidence of disease in animals with neoplastic lesions or diskospondylitis when radiographs are equivocal. Both CT and MRI can be useful in the diagnosis of IVDD although MRI is superior to other imaging techniques for soft tissue disease involving the spinal cord or nerve roots, and is indispensable for certain conditions, such as COMS. Myelography can demonstrate compressive spinal cord lesions, such as IVDD, CCSM, and neoplastic disease, although is less commonly performed with increased access to CT and MRI.

Analysis of CSF is critical for making a diagnosis of meningomyelitis, and typically shows elevations in cell counts (pleocytosis) and protein levels. Specific serum titers or other tests (e.g., PCR) for infectious diseases may be considered for animals with meningomyelitis. Most compressive spinal cord disease will result in elevations of protein levels without pleocytosis (albuminocytologic dissociation). Rarely, neoplastic cells are seen in CSF. If AAS is a consideration, survey radiographs must be performed before collection of CSF from the cerebellomedullary cistern to avoid serious spinal cord injury. Electromyography (EMG) and other electrodiagnostic tests are occasionally useful in the identification of focal spinal lesions or to demonstrate neuromuscular diseases (e.g., polymyositis).

TREATMENT CONSIDERATIONS FOR NECK AND BACK PAIN PATIENTS

Compressive disease involving the spinal cord (e.g., IVDD, AAS, CCSM, LSD, fractures/luxations, neoplasia) and/or nerve roots is best treated with surgical decompression in many cases. Certain of these conditions, such as fractures, AAS and in some cases CCSM and LSD, require surgical stabilization as well. However, many patients with compressive diseases can be managed medically, usually with a combination of **strict confinement**, analgesics and occasionally glucocorticoids. NSAIDS may be less effective for nerve root pain, although they are often quite useful for lesions of the vertebrae. NSAIDS **should not** be used in combination with glucocorticoids. Diazepam or methocarbamol are useful to control the pain associated with muscle spasm secondary to nerve root compression. Gabapentin can be very useful for pain of neuropathic origin. Ketamine and amantadine are NMDA receptor antagonists that can be useful adjuncts to address some of the pathophysiologic processes associated with pain (“windup”), and may be beneficial for acute and chronic pain patients respectively. Pregabalin is a relatively new medication with a mechanism of action similar to gabapentin, but with a greater potency. Combinations of the above medications can take advantage of multiple mechanisms of action and may be more effective than single medications. Acupuncture can also be a useful adjunct, particularly in chronic cases.

Appropriate antibiotic therapy (ideally directed by culture and sensitivity) for a minimum of 8 weeks is recommended for diskospondylitis cases. Meningomyelitis may require specific antimicrobial therapy if an infectious etiology is identified. Patients without an apparent infectious etiology usually respond well to glucocorticoid therapy, which is tapered to the lowest controlling dose, and may eventually be discontinued in some cases. Additional immunosuppressive or cytotoxic drugs may be useful in animals not controlled with glucocorticoids alone, or intolerant of their side effects. Animals with neoplasia involving the spine, meninges, nerve roots or spinal cord may benefit from surgical debulking and radiation therapy, or chemotherapy in some cases.

Some Potentially Beneficial Medications in the Therapy of Neck and Back Pain in Small Animals

Diazepam	2-10 mg/animal PO q 8 hours
Methocarbamol	15-20 mg/kg PO q 8 hours
Gabapentin	3-10 mg/kg PO q 6-12 hours
Pregabalin	2-4 mg/kg PO q 8-12 hours (start at low end & escalate as needed)
Ketamine	0.5 mg/kg bolus IV, then 0.1-0.3 mg/kg/hour constant rate infusion
Amantadine	1.25-4 mg/kg PO q 12-24 hours
NSAIDs	Variable by drug

REFERENCES & FURTHER READING

1. Bagley RS. Spinal neoplasms in small animals. Vet Clin North Am Small Anim Pract 2010;40:915-927.
2. Brisson BA. Intervertebral disc disease in dogs. Vet Clin North Am Small Anim Pract 2010;40:829-858.
3. Cerda-Gonzalez S, Dewey CW. Congenital diseases of the craniocervical junction in the dog. Vet Clin North Am Small Anim Pract 2010;40:121-141.
4. Coates JR, Jeffery ND. Perspectives on meningoencephalomyelitis of unknown origin. Vet Clin North Am Small Anim Pract 2014;44:1157-1185.
5. da Costa RC. Cervical spondylomyelopathy (wobbler syndrome) in dogs. Vet Clin North Am Small Anim Pract 2010;40:881-913.
6. Jeffery ND. Vertebral fracture and luxation in small animals. Vet Clin North Am Small Anim Pract 2010;40:809-828.
7. Lamont LA. Multimodal pain management in veterinary medicine: the physiologic basis of pharmacologic therapies. Vet Clin North Am Small Anim Pract 2008;38:1173-1186, v.
8. Lamont LA, Tranquilli WJ, Grimm KA. Physiology of pain. Vet Clin North Am Small Anim Pract 2000;30:703-728.
9. Mathews KA. Neuropathic pain in dogs and cats: if only they could tell us if they hurt. Vet Clin North Am Small Anim Pract 2008;38:1365-1414.
10. Meij BP, Bergknut N. Degenerative lumbosacral stenosis in dogs. Vet Clin North Am Small Anim Pract 2010;40:983-1009.
11. Talarico LR, Schatzberg SJ. Idiopathic granulomatous and necrotising inflammatory disorders of the canine central nervous system: a review and future perspectives. J Small Anim Pract 2010;51:138-149.
12. Tipold A, Stein VM. Inflammatory diseases of the spine in small animals. Vet Clin North Am Small Anim Pract 2010;40:871-879.

