



Charlotte Animal Referral & Emergency

## **A PAIN IN THE NECK-CERVICAL MYELOPATHIES**

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Cervical hyperesthesia (painful response to a noxious stimulus) is a common presentation in clinical practice. The causes are variable ranging from benign to sinister. More often, than not, these cases have a positive outcome if the underlying etiology can be identified and addressed.

First, it is important to recognize the cervical pain is not spinal cord pain. The neuroparenchyma itself has few nociceptors. Pain originates from the structures outside/adjacent to the spinal cord including the annulus fibrosis of the intervertebral disc, the meninges, the periosteum, the nerve roots (radicular), the muscle and the joints. Recognizing where the source of the hyperesthesia emanates from are important for both pathologic understanding and choice of therapeutics.

Dogs with cervical hyperesthesia may have other neurologic deficits but often do not. This is in contrast to thoracolumbar disease which frequently co-presents with proprioceptive or motor abnormalities. The predominant thought is that it relates to the larger canal:cord ratio in the neck than the back. It also speaks to why cervical disease can be much more severe and refractory to medical management when pain is the sole clinical sign.

Identifying cervical hyperesthesia is often as simple as noting a low head carriage at the walk. These dogs often have muscle fasciculations in the neck and shoulders. In more chronic cases, neurogenic atrophy can be noted in the supraspinatus muscles. Lateral motion of the neck may elicit a pain response but in the author's experience ventroflexion and lateral palpation are most effective. The dogs may be ataxic in all limbs and postural reaction deficits may also be noted. The thoracic limbs may be spastic/hypertonic with normal reflexes in C1-6 myelopathies that have upper motor neuron disease. The limbs are flaccid/hypotonic with poor reflexes and atrophy in C6-T2 myelopathies with lower motor neuron disease. Dogs with C6-T2 myelopathies may also have poor motor component to their cutaneous trunci and Horner's syndromes.

Several etiologies implicated in cervical hyperesthesia are to follow. Prioritizing the differential diagnosis list is based on a combination of signalment, acuteness of onset, severity of hyperesthesia and progression. From a diagnostic standpoint, cervical radiographs are often non-specific but indicated. They are useful in ruling out traumatic disease or severe discospondylitis and osteolytic neoplastic disease.

## **Intervertebral Disc Disease (IVDD)**

With a high prevalence in chondrodystrophic breeds, cervical IVDD is nearly as common as thoracolumbar disease. Although survey spinal radiography may reveal changes suggestive of IVDD, these changes are seen in predisposed breeds and are not indicative of causal pathology.<sup>1</sup> Conservative therapy is a combination of supportive care, anti-inflammatories and analgesics. The success rate associated with conservative management of dogs with neck pain only from cervical IVDD is 50–90%, but nearly half of conservatively managed dogs will have a recurrence of clinical signs. Surgical therapy has a >90% success rate and is generally considered a rapid recovery with infrequent complications.

## **Atlantoaxial Subluxation (AAS)**

AAS is a relatively frequent cause of C1-6 myelopathies in toy breeds of dogs, although and can occur in any age or breed. In suspected cases, care should be taken with manipulation of the neck. Developmental abnormalities of the dens (hypoplasia or aplasia) or malformations of or trauma to the supporting ligaments are responsible for the development of clinical signs, which results in instability of the atlantoaxial joint and contusion and/or compression of the spinal cord.

Radiographs are often diagnostic for AAS and on lateral projection, an increase in the space between the dorsal arch of C1 and the spinous process of C2 (> 4 mm) is noted. That said, advanced imaging is often recommended prior to surgery because of the high co-presence of cranio-cervical malformations such as caudal occipital malformation syndrome.

Treatment for the condition is most frequently surgical. Conservative management has a 50% success rate and the challenges of external coaptation near the mouth and around the neck. Surgery can be performed by either dorsal or ventral techniques and is most often associated with a positive outcome.

## **Cervical Spondylomyelopathy (CSM)-“wobblers disease”.**

A bimodal disease that affects either young giant breed dogs or older large breed dogs. The giant breed dogs have an osseous stenosis that causes a dorsolateral compression. Large breed dogs, most specifically Dobermans have a ventral “Disc associated” compressive syndrome. Both of these conditions can be constitutively present or only compressive in dynamic positions (predominantly extension). Survey radiographs are less helpful in these conditions and advanced imaging is indicated. Conservative approaches have been described but this too is often considered a surgical disease with varying reported success rates.

## **Infectious/inflammatory disease**

The most common inflammatory disease that causes cervical hyperesthesia is discospondylitis. Though an uncommon diagnosis in the neck, it can occur here both in a solitary and multifocal fashion. The most common etiologies are bacterial, specifically *Staphylococcus pseudointermedius*. Other considerations include common bacteria (*E coli*, *Strep sp*), the zoonoses *Brucella sp.* and fungal organisms. Diagnosis is typically made by radiography, with a classic “moth eaten” loss of definition to the vertebral endplates and adjacent sclerosis. If the mineral changes are not significant, advanced

imaging may be required for a definitive diagnosis. Fine needle aspiration has a low sensitivity for diagnosis and more commonly combined urine and blood culture is pursued in conjunction with Brucella ELISA/IFA with or without fungal antigen testing. Empiric therapy with cephalexin is the most common approach to therapy.

Meningomyelitis can also be causal for neck pain and is either infectious or non-infectious. Common infectious agents include Toxoplasma, Neospora, and Cryptococcus. Just as in the brain, most cases of myelitis are non-infectious and fall on the spectrum of conditions similar to GME or other meningoencephalitis of unknown etiology. One of the more common sterile myelitis presentations are "steroid responsive meningitis and arteritis (SRMA). It commonly falls along breed lines such as beagles (beagle pain syndrome), nova scotia duck tolling retrievers, pointers and Bernese mountain dogs. Therapy is a tapering course of immunosuppressive steroids, often starting as high as prednisone 4 mg/kg/dy. Though response to therapy is generally high, recurrence is common when cases are tapered too quickly.

### **Neoplasia**

Any neoplasm that compresses the pain sensitive structures can result in cervical hyperesthesia. There is a high predominance of intradural tumors in the cervical spine including meningiomas and malignant nerve sheath tumors. Soft tissue sarcomas can be causal as can round cell tumors that affect bone such as plasma cell tumors. The tumors can be acute or chronic on presentation based on the affect they have to the vertebral bones. Survey radiographs are considered specific but not sensitive in that over 60% of the bone must be demineralized before radiolucency is noted. Therapies are variable and some tumors may respond to chemotherapeutic (round cell tumors) or radiation therapy (meningioma) while other don't respond to either ancillary therapy. Surgical therapy is valuable for decompressive and diagnostic purposes but is often not curative in isolation because of the difficulty in attaining complete excision.

## **KEY DRUGS, DOSAGES AND INDICATIONS**

### ***Pharmacologic treatment of the patient with neck pain***

**Adopted from J Rossmeisl DVM, MS DACVIM (SAIM, Neurology)**

	<b>Drug choices</b>	<b>Dose</b>	<b>Route</b>
<b>Tier 1*</b> Initial therapy - Mild/moderate pain	Carprofen	2.2 mg/kg PO q 12 hrs	PO, SC
	Prednisone	0.5 mg/kg/day	PO
	Acetaminophen/Codeine	Dose to codeine equivalent of 0.5–1 mg/kg q 6 hrs	PO
	Gabapentin	15 mg/kg q 8hrs	PO
<b>Tier 2</b> Add to Tier 1 agent - Moderate, severe, or persistent pain	Tramadol	2–5 mg/kg PO q 8–12 hrs	PO
	Methocarbamol	22–44 mg/kg PO q 8 hrs	PO
	Diazepam	0.25–0.5 mg/kg PO q 8 hrs	PO, IV
<b>Tier 3</b> Add to Tier 1 and 2 agents - Medically refractory pain Use as initial therapy for severe pain	Morphine	0.25–1.0 mg/kg q 4–6 hrs	IM, SC
	Oxymorphone	0.1–0.2 mg/kg q 4–6 hrs	IM, IV, SC
	Hydromorphone	0.1–0.4 mg/kg q 4–6 hrs	IM, IV, SC

\* Drug choices in this tier should not be used in combination.