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Cervical spondylomyelopathy (CSM) or wobbler syndrome is a disease of the cervical spine commonly seen in large and giant breed dogs. It is characterized by compression of the spinal cord and/or nerve roots which leads to neurological deficits and neck pain.

PATHOPHYSIOLOGY
- The pathophysiology of CSM involves a compressive lesion caused by intervertebral disk herniation, osseous malformation or both, in a stenotic vertebral canal.
- Disk associated compression is usually seen in dogs older than 3 years. The intervertebral disk degeneration and subsequent protrusion might be secondary to abnormal articular facet articulation in Dobermans Pinscher dogs, which predisposes them to increased rotational strain in the intervertebral disks.
- Vertebral malformation (bony associated compression) – Most commonly seen in giant breed of dogs, usually in young adult dogs (< 3 years). The osseous malformation can compress the spinal cord in any direction.
- Dynamic spinal cord compression (one that changes with different positions of the cervical spine) is always a component of the pathophysiology with any type of compression.
- Current evidence does not suggest that instability has a primarily role in the pathogenesis of CSM.

DIAGNOSIS

Signalment

Doberman pinscher is the most commonly affected breed. Other breeds with a high incidence are the Great Dane, Rottweiler, Weimaraner and Dalmatian. The disease is seen in any canine breed, including small breed dogs.

Historical findings

Chronic slowly progressive gait dysfunction is characteristic. Acute presentations are usually associated with neck pain. Occasionally, acute worsening of a dog with chronic history is observed.

Neck pain or cervical hyperesthesia is a common historical finding. It occurs in approximately 65-70% of Dobermans, and 40-50% of other breeds.
Neurological examination findings
- Neck pain is the primary complaint in 5-10% of patients.
- The gait of dogs with CSM is characterized by proprioceptive ataxia. The ataxia is more obvious in the pelvic limbs with lesions in the caudal cervical spine (C5-6, C6-7). Compressive lesions in the mid-cervical spine tend to cause ataxia in all four limbs.
- Proprioceptive positioning deficits are usually present, but dogs with chronic ataxia may not display them.
- Dogs can present with non-ambulatory tetraparesis.

Imaging
Survey radiographs serve as a screening tool to rule out bony disorders. Although intervertebral disc narrowing or vertebral tipping can be seen, these findings are not specific for CSM since they can be observed in clinically normal large breed dogs. Osteoarthritic changes of the articular processes can be seen in giant breeds.

- Myelography can define the location(s) and the direction (ventral, dorsal, lateral) of the spinal cord compression. Myelography in stress positions of flexion or extension can be performed but offer significant risk of neurological deterioration. Linear traction myelography is a safer procedure and can distinguish a static from a dynamic lesion.
- Computed tomography (CT) myelography allows cross-sectional visualization of the spinal cord compression and determination of sites with spinal cord atrophy.
- Magnetic resonance imaging (MRI) allows visualization of the spinal cord parenchyma, intervertebral disk, soft tissues and nerve roots, and the images can be obtained in any plane. Traction images (kinematic studies) can also be done with MRI.

A study compared myelography and MRI in the diagnosis of CSM in 18 Doberman pinschers. The results showed that while myelography can identify the location of compressive lesions in the majority of dogs, it can also underestimate the severity of the lesion and not identify them precisely. The main advantage of MRI is its ability to demonstrate the spinal cord parenchyma, showing spinal cord signal changes. The study concluded that MRI was more accurate in predicting the site, severity and nature of spinal cord compression. Another recent study compared myelography, CT-myelography and MRI in 22 dogs with disc-associated CSM. The study found moderate agreement of all modalities in identifying the most severe compressive lesions and the authors conclude that CT-myelography and MRI could be seen as complementary.

TREATMENT
Treatment of CSM can be either surgical or medical (conservative). Conservatively treated dogs should have restricted activity for at least 2 months. Oral corticosteroids can also be used and many dogs respond well to corticosteroid therapy at least initially. Medical management for CSM was recently revisited in two studies (da Costa et al, 2008; De Decker et al, 2009). A study compared the outcome of dogs treated medically and surgically and found that 54% of dogs treated medically improved and 27% were unchanged in a long-term follow-up.(10) Comparatively, surgical treatment lead to improvement in 81% of dogs. This shows that, while surgery does offer the best changes of improvement for dogs with CSM, medical management is an acceptable alternative. The author also likes to start all dogs on medical management initially to evaluate the improvement obtained with it and to give owners the opportunity to decide on surgery. The response to medical management (exercise restriction and corticosteroids) can be used to indirectly assess the degree of reversible spinal cord lesions.
### Surgical treatment

Surgical techniques for CSM can be grouped into 3 broad categories: direct decompressive techniques, indirect decompressive or vertebral distraction techniques, and motion preserving techniques. Much controversy exists on this topic, as there are more than 25 surgeries reported to treat CSM. Overall, the success rate of most surgeries is approximately 80%. Fenestration provides a lower success rate (33%) and is not recommended. The study comparing medical and surgical treatment found an improvement rate of 81% with surgery (most dogs had a ventral slot). Interestingly, in the same study, no difference was seen in the survival time of dogs treated medically or surgically (36 months for both groups, and recent re-evaluation of the data indicates an even lower survival – 24 months).

Currently, the choice of surgical technique is based mainly on personal preferences. The concept of dynamic and static lesions based on traction myelography, which has guided the selection of several distraction techniques, is rather highly subjective. Cervical disc replacement is becoming the standard of care for humans with cervical spondylotic myelopathy. Cervical disc arthroplasty is now being investigated in dogs with CSM. Initial results are promising but long-term data is still not available.

In order to evolve in the treatment of CSM, more studies are needed to expand our understanding of its pathogenesis, and to establish guidelines to perform and interpret kinematic imaging studies.

### References


