An Update on Intervertebral Disc Disease

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Degeneration of intervertebral discs is an inevitable consequence of aging in dogs, with different forms of degeneration recognized. As a result of these changes, disc material may either extrude (acute herniations) or protrude (chronic herniations) contusing and compressing the spinal cord and causing pain and neurological deficits. This presentation will focus on the diagnosis and management of acute disc herniations, including the classic Hansen type I disc herniation common in chrondrodystrophoid breeds as well as non-compressive disc herniations common in mid-sized to large breed dogs.

Diagnosis initially rests on recognition of signs of focal myelopathy, which could range in severity from spinal pain only to complete paralysis. Acute cervical disc herniations are more likely to cause pain alone, while paraparesis or paraplegia are the most common consequence of thoracolumbar disc herniations. Signs may be acute or subacute in onset and may cause progressive deterioration or stabilization over a 24-48 hour period followed by improvement depending on the degree of compression and ongoing disc extrusion. Spinal pain is a common finding, but an absence of spinal pain does not rule out an acute disc herniation. Neurological findings relate to the location of the disc herniation and following the examination, it is important to localize the signs and grade their severity (table 1 below).

Grade	Signs
0	Normal
1	Spinal pain, no neurological deficits
2	Ataxia and ambulatory paraparesis
3	Non-ambulatory paraparesis
4	Paraplegia with pain perception
5	Paraplegia without pain perception

Spinal radiographs may show evidence of disc degeneration (nuclear calcification) and may show signs of herniation (narrowed disc space, opacification of the intervertebral foramen), but a definitive diagnosis is only established with advanced imaging using magnetic resonance imaging (MRI), computed tomography (CT) or myelography. CT can be used to diagnose mineralized disc herniations very effectively but fails to identify soft tissue herniations without myelography. MRI is specific and sensitive, and can give prognostic information, but is more expensive and less readily available.

Do you have to do surgery?
Typically we are referring to classic Hansen type 1 disc extrusions (IVDE) in which there is obvious spinal cord compression on cross sectional imaging when we talk about surgery for acute thoracolumbar extrusions. However, there are many types of acute disc extrusion and some are not associated with compression, therefore surgery is not indicated.

Name	Disc changes	Compression?
Hansen type 1	Calcified nuclear material extruded	Yes in varying amounts
Traumatic disc	'Normal' disc extruded due to external trauma. Degree of compression depends on state of disc.	Often no
Non-compressive nuclear extrusions	Normal hydrated nucleus. Typically not compressive, hence the name, but sometimes these can be compressive.	Often no
Acute annular extrusions	Large flaps of annulus +/- nucleus found at surgery. May be associated with extensive epidural hemorrhage	Yes

Severity of signs
Classic recommendations are that non-ambulatory dogs benefit from decompressive surgery. The risk benefit ratio tips in favor of **conservative** management as the signs get less severe. When evaluating the benefit of surgery, it is important to note that recovery in an important outcome, but it is just as important to look at recurrence. As such the question of decompression with or without fenestration becomes very important. The following tables take a critical look at the outcomes reported by a variety of studies over the years, first of all evaluating conservative management, then fenestration alone and finally decompressive surgery.

Outcomes of dogs with TL acute IVDE managed conservatively.
Grade 2: ambulatory paraparetic, grade 3 (non ambulatory paraparetic), grade 4 (paraplegic with pain perception) and grade 5 (paraplegic without pain perception. The % are the % of

Conservative management Grade	2	3	4 (5)	5
Funquist		82% (33)	39% (64)	0% (44)
Davies & Sharp		100% (10)	50% (6)	7% (14)
Levine	48% (63)	57% (23)	50% (12)	0% (3)
Summary		~ 75%	~ 50%	<10%

dogs that regained ambulation, and the numbers in brackets are the number of dogs studied. Not shown in the table is the fact that there is a recurrence rate of 48% (Funquist) and 31% (Levine).

Fenestration alone is surprisingly effective and the addition of surgical decompression does improve outcome further, particularly for the more severely affected dogs:

Grade	**2**	**3**	**4**	**5**
Summary surgery	~ 100%	~ 100%	90%	58%
Summary fenestrate	90%	90%	90%	35%
Summary conserv	75%		~50%	<10%

When should you do surgery?
There are a lot of data on this, the key question being is it an emergency? Our guidelines are to do surgery on any dog that cannot walk within 24 hours and for dogs without pain perception, to do it within 8 hours (i.e. immediately unless arriving in the early hours of the morning). Importantly, there is little to no evidence that there is a magical window within which surgery should be performed. However, while published data does not show an effect of timing of surgery, we have new data that suggests that delaying surgery increases the risk for myelomalacia.

What about neuroprotective drugs?
Watch this space – there are currently no treatments supported by RCT.

Postoperative management
Dogs should be strictly confined for 4 weeks, with appropriate pain control and bladder management. Rehabilitation should be initiated in those that do not rapidly recover. Pain control is important. In recent RCT we demonstrated a long-term reduction in post-operative pain in dogs with pulsed electromagnetic fields and failed to show a benefit of rehabilitation. However, we did find that 2 weeks of hospitalization rather than rapid discharge to pet owners seemed to be associated with more rapid return to walking.

Conservative treatment for both thoracolumbar and cervical disc herniations
Dogs should be **strictly cage confined** in a crate for a minimum of 2 weeks, taken out to urinate and defecate 3 – 4 times a day and at that time, passive range of motion exercises performed. After 2 weeks, the amount of controlled exercise the dog can do when it is taken out can slowly be increased with the dog on a leash, supported by a sling if needed and

walking only but must still be confined when not performing exercises. Pain can be managed with non-steroidal anti-inflammatory drugs such as carprofen and opiates such as torbugesic (can be given orally) or fentanyl. Muscle relaxants e.g. diazepam or methacarbamol are helpful with neck pain as much of the pain is due to muscle spasm. Anti-inflammatory doses of corticosteroids (0.25 - 0.5mg/kg/day of prednisone) can be used in dogs with neck pain once the diagnosis is confirmed, but are not typically necessary for back pain, and should never be used without cage confinement. The dog should be evaluated regularly for any deterioration in neurologic status, or lack of improvement over 2 weeks, both of which indicate treatment failure. If the dog has motor function it should be able to urinate on its own, but owners should be coached in palpation and expression of the bladder, and required to seek veterinary help if their dog doesn't urinate voluntarily twice a day. If improvement is seen after 2 weeks, the conservative route can be pursued and the dog is transitioned to normal activity (excluding jumping and twisting) by a gradual increase in exercise between the fifth through eighth weeks.

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