Disc Disease – What's the latest with steroids and rest?

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Abstract: In this session, we will review the types of disc disease that can affect dogs and the clinical signs which result. We will outline the diagnostic work and the treatment options available based upon the severity of the clinical signs.

Keywords: Intervertebral disc, thoracolumbar, corticosteroids, paralysis, nociception

Thoracolumbar (Type I) Disc Disease

Clinical signs: Onset of neurological signs may be peracute (<1 hour), acute (<24 hours) or gradual (>24 hours). Dogs presented with peracute or acute thoracolumbar disc extrusions may manifest clinical signs of spinal shock or Schiff-Sherrington postures. These indicate acute and severe spinal cord injury but do not determine prognosis. The degree of neurological dysfunction is variable and affects prognosis. Clinical signs vary from spinal hyperaesthesia only to paraplegia with or without pain perception. Dogs with back pain only are usually reluctant to walk and may show kyphosis. Dogs with back pain alone and no neurological deficits often have myelographic evidence of substantial spinal cord compression. Neuroanatomic localization for thoracolumbar lesions is determined by intact (T3–L3) or hyporeflexive (L4–S3) spinal reflexes and by site of paraspinal hyperaesthesia. Asymmetric neurological deficits maybe less reliable for determining the side of disc extrusion.

Diagnosis: The initial diagnosis of thoracolumbar IVDD is obtained from the signalment, history and neurological examination. Differential diagnoses to be considered include trauma, FCE, discospondylitis, neoplasia and (meningo)-myelitis. Diagnosis of thoracolumbar disc extrusion and/or protrusion is confirmed by radiography and surgery. Survey spinal radiography can help to determine the diagnosis and site of a thoracolumbar disc extrusion if Roentogenic signs are well defined and consistent with neuroanatomical localization. Studies of dogs with surgically confirmed thoracolumbar IVDD showed that when identifying the site of disc extrusion survey radiography had an accuracy of 68–72%; but the percentage accuracy was higher with myelography. Normal variants for the thoracolumbar spinal region include narrowing of the anteclinal disc space at T10–T11 and of the L4–L6 interspaces. As survey radiographs only identify the correct site of disc extrusion in about 70% of cases, further imaging, such as myelography, is strongly recommended by most neurosurgeons prior to surgery. Myelographic contrast injection at the caudal lumbar region is preferred over the cerebellomedullary cistern for demonstrating thoracolumbar disc extrusion. Longitudinal lesion localization by myelography for thoracolumbar IVDD varies in accuracy from 40% to 97%, but is usually close to 90%. CT or MRI are used alone or as an adjunct to myelography to more completely delineate lateralizationof extruded disc material. CT has been shown to be more accurate than myelography at identifying the major site of disc herniation and has the advantage of being a more rapid test with fewer side-effects than myelography. MRI can provide multiplanar views of the cord compression allowing an accurate surgical approach and can help to identify associated vertebral canal haemorrhage and determining the extent of surgical decompression required. MRI can also identify parenchymal lesions, such as oedema or infarction that may affect the prognosis.

Treatment:

Conservative management – Indications for non-surgical treatment of thoracolumbar IVDD include a first time incident of spinal pain only, mild to moderate paraparesis and the financial constraints of the client. The latter is the only reason for non-surgical treatment of a recumbent patient, which should always be considered a surgical candidate if possible. Dogs can be managed with strict cage rest for 4–6 weeks combined with pain relief using anti-inflammatory drugs, opioids and muscle relaxants. Gastrointestinal protectants also maybe necessary with use of anti-inflammatory therapies. Dogs should be monitored closely for deterioration of neurological status. If pain persists or the neurological status worsens, surgical management is recommended. Success rates for conservative management of ambulatory dogs with pain only or mild paresis ranges from 82% to 100%. Studies have shown that recovery rates in non-ambulatory dogs are lower and recurrence rates are higher following conservative treatment.

Surgery – Indications for surgical management of thoracolumbar IVDD include spinal pain or paresis unresponsive to medical therapy, recurrence or progression of clinical signs, paraplegia with intact deep pain perception and paraplegia without deep pain perception for <24–48 hours. Prolonged loss of deep pain perception (>48 hours) carries a poor prognosis and owners should be made aware of this prior to surgery. However, it is often difficult to know when deep pain perception was lost and recovery have been observed in dogs that had surgery more than 5 days after the onset of paraplegia. Surgery includes spinal cord decompression by removal of extruded disc material. Chronicity of disc extrusion at the time of surgery may influence the ease with which extruded disc material can be removed. Decompressive procedures for thoracolumbar

IVDD are dorsal laminectomy, hemilaminectomy and pediculectomy (also termed mini-hemilaminectomy). There are advantages and disadvantages of each decompressive technique. Hemilaminectomy significantly improves retrieval ofextruded disc material with minimal spinal cord manipulation;a clear advantage over pediculectomy and dorsal laminectomy. Pediculectomy is the least invasive and destabilizing technique but these advantages may not be clinically significant except in cases that require a bilateral approach to the vertebral canal. Unilateral facetectomy and fenestration do not significantly destabilize the spine in lateral bending, which suggests that the articular facets of the thoracolumbar spine are more important to stiffness in axial rotation and extension.

The type of decompressive procedure may not affect outcome; however, the ability to retrieve disc material depends on the decompressive procedure.The primary purpose of decompressive surgery is to provide adequate exposure to allow removal of disc material while minimizing spinal cord manipulation.

Hemilaminectomy provides the same degree of decompression as dorsal laminectomy and is less frequently associated with a post-surgical constrictive laminectomy membrane.

Prognosis: Overall success rates after decompressive surgery range from 58.8% to 95%. However, the success of a surgical approach may depend on what criteria are used to define it, how long after the surgery the patient is assessed, as well as the outcome which the owners are willing to accept. Surgical success may be improvement of the patient's pre-surgery neurological

grade but may not mean that the patient is functionally normal and residual signs, e.g. incontinence, can be unacceptable to many owners.

Differences in recovery rates of non-ambulatory dogs vary according to the severity of neurological dysfunction (neurological grade), time interval from initial clinical signs to surgery and speed of onset of signs.

Neurological grade – Deep pain perception is considered the most important prognostic indicator for a functional recovery. In general the majority of dogs with intact deep pain perception, whether paraplegic or simply paraparetic, have an excellent prognosis particularly if treated surgically. Dogs with loss of deep pain perception for more than 24–48 hours prior to surgery have a poorer prognosis for return of function. Without surgery, or with delayed surgery, dogs with absence of deep pain perception have an extremely guarded prognosis, although duration of absence of deep pain perception prior to surgery as a prognostic indicator is controversial. Recovery rates for dogs with thoracolumbar IVDD and absent deep pain perception range from 0–76%. A recent study of 87 dogs with loss of deep pain perception reported 58% of the animals regained deep pain perception and the ability to walk. In summary, dogs with absence of deep pain perception that have surgery within 12–36 hours have a better chance of more rapid and complete recovery than those with delayed surgery. Dogs with more severe neurological dysfunction have a longer period of recovery. The mean time from post-surgery to walking varied from 10 days for pain only or paraparetic dogs to 51.5 days for paraplegic dogs. More recent long-term studies reported recovery times of 2–14 days for dogs that were either ambulatory or non-ambulatory with voluntary motor movement, and up to 4 weeks for paraplegic dogs.

Onset and duration of clinical signs – There are many contradictory studies about the effect of (a) the speed of clinical sign onset and (b) the duration of the clinical signs prior to surgery, on the time taken for recovery and the final outcome. In general it is agreed that rapid removal of extruded disc material facilitates a more complete and rapid recovery. Dogs with a shorter duration of clinical signs prior to surgery and a gradual onset of neurological dysfunction (<48 hours) have a quicker recovery. However, a recent study of 71 paraplegic dogs with intact deep pain sensation demonstrated that although a shorter duration of signs was indeed associated with a shorter recovery time, the rate of onset of clinical signs did not influence the recovery time. However, the rate of clinical sign onset did influence the final outcome. Similarly, A peracute onset of signs indicated a poorer prognosis for dogs with no deep pain perception in one study. The outcome of dogs after hemilaminectomy with the duration of clinical signs has been evaluated and it was shown that delay before surgery does not influence outcome in dogs with mild neurological dysfunction but does affect functional recovery in paraplegic dogs. When performed within 12 hours of clinical sign onset, hemilaminectomy in paraplegic dogs had a higher success rate.

Cervical disc disease

Presentation and pathogenesis

Cervical disc disease is a common problem in chondrodystrophoid breeds of dog such as Dachshunds, Shih Tzus, and Pekingese. It also occurs frequently in Beagles and Cocker spaniels and can occur sporadically in almost any breed. Although thoracolumbar disc herniations have been reported in cats, cervical disc herniations are extremely rare. The intervertebral disc is

composed of an outer fibrous portion (the anulus fibrosus) and a gelatinous center (the nucleus pulposus). With normal ageing the nucleus is slowly replaced by fibrocartilage, but in chondrodystrophoid breeds the nucleus ages prematurely and the nucleus matrix degenerates and mineralizes. As a result of these degenerative changes, affected dogs are prone to extrusion of the mineralized nucleus pulposus into the spinal canal, (Hansen type 1 disc herniations) causing spinal cord concussion and compression. The C2/3 disc is most commonly affected, with incidence decreasing further caudally in the cervical spine.

Onset of signs can occur from eighteen months of age, with a peak incidence between three and seven years of age. It is very unusual for a disc herniation to occur in dogs less than two years of age as the predisposing degenerative changes have not occurred. The most common presenting sign is severe neck pain as there is enough space within the cervical vertebral canal for herniation of disc material without compression of the spinal cord. The dog may adopt a stance with the head held down, neck rigid and back arched as the weight is shifted to the pelvic limbs. Entrapment of nerve roots can cause a nerve root signature (holding up a thoracic limb and lameness). The neck pain is so severe that dogs avoid moving their head, and spasm and rigidity of the cervical musculature are easily palpable. Neurological deficits are less common but can occur when the spinal cord is sufficiently compressed and include tetra or hemiparesis or -plegia, ataxia, and conscious proprioceptive and postural reaction deficits.

Diagnosis

Survey radiographs should be taken to identify degenerative changes typical of a disc herniation and to rule out other causes of the signs. Changes indicative of a disc herniation include

narrowing of the intervertebral disc space, narrowing of the intervertebral foramen and the presence of mineralized material within the vertebral canal and disc space. However, a definitive diagnosis cannot be reached with survey radiographs alone with adequate accuracy for surgery to be undertaken and either MRI, computed tomography or myelography are used to identify the site of spinal cord compression. CSF analysis is performed concurrently to rule out an inflammatory disorder.

Treatment

Conservative

Dogs can be managed conservatively with strict cage rest for four weeks combined with pain relief using anti-inflammatory drugs, opiates and/or muscle relaxants. Judicious use of anti-inflammatory doses of corticosteroids combined with appropriate cage confinement can be attempted if the pain is not responsive to non-steroidal anti-inflammatory drugs. Muscle spasm can also be responsive to gentle massage and hot packing of the neck. Administration of an H2 blocker such as famotidine may help to prevent the development of gastric ulceration. The aim of cage rest is to allow defects in the annulus fibrosus to heal, and resolution of pain does not mean that confinement should be discontinued. If this approach is successful, gradual reintroduction to controlled exercise can be attempted and the owners should be cautioned to prevent their pet from activities that involve jumping in the long term. Dogs should be monitored weekly and if the pain is unresponsive to conservative therapy, recurs, or neurological deficits develop, surgery should be recommended.

Surgery

Indications for surgery include unremitting or severe pain, recurrent pain, or neurological deficits. Once the site of disc herniation has been confirmed, a ventral slot is performed to remove the herniated disc material . Adjacent discs are fenestrated to prevent recurrence of the problem. Post operatively dogs are provided with pain relief and confined for four weeks (two weeks of strict confinement and then if doing well, two weeks of increasing controlled exercise). Dogs are then gradually re-introduced to normal activity. If the dog has neurological deficits, postoperative care includes performing passive range of motion exercises, massage, hydrotherapy and controlled exercise.

Prognosis

Prognosis for dogs treated conservatively is unknown. Prognosis for dogs treated surgically is excellent unless neurological deficits are severe.