WHEN IS A SPINAL NOT A DISC PROLAPSE?

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ABSTRACT

Dogs showing the early signs of spinal pain and/or neurological deficits are commonly presented in small animal practice. The big question is; when is this case a straight forward disc prolapse and when is it one of the number of other spinal conditions with similar presentations. The differentiation is easier than we think. Predictable clinical signs exist for recognising lesions occurring in both the central and peripheral nervous systems. The aim of this article is to demonstrate a diagnostic protocol, based on practical experience, which makes getting to a clinical diagnosis easier and helps the clinician decide when urgent medical or surgical intervention is required.

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NTRODUCTION

A number of differential diagnoses exist for dogs presenting with signs of spinal pain and/or neurological deficits. The aim of the paper is not to discuss these conditions in detail, but rather to pick out characteristic patterns that tend to exist. By following a logical approach to these cases and recognising the clinical abnormalities that are present, we are much more likely to find the correct diagnosis.

WHERE TO START?

The first step is to obtain a good clinical and treatment history. Record the age of the patient as this can mean a completely different list of differential diagnoses. We need to establish how long ago the problem started and what the patient was doing when clinical signs were first noticed. There is often surprisingly little trauma involved. More importantly, we need to know how fast the clinical signs have progressed. Previous treatments that may have been given, by either the owner or other veterinarians need to be noted, as these could influence our clinical examination. We need to determine whether the dog has had any previous incidents showing similar clinical signs.

CLINICAL EXAMINATION

Clinical examination should always begin with observing the patient's mental and ambulatory status. Place the animal on the floor of the consulting room and get an idea of whether you are dealing with an orthopaedic or neurological problem. If neurological, are clinical signs related to the central or peripheral nervous system? Use this time to assess the level of pain and degree of motor function. Even dogs with bilateral pelvic limb paresis may show slight motor function, which provides us with more information and greatly improves the prognosis. Large breed dogs are often easier to examine outside the consulting room on a "non-slip" surface, where they can be trotted and turned in circles. Carefully note any muscle atrophy, ataxia, high stepping gait abnormalities or dragging of the claws. "Root signs" caused by compression of specific nerve roots will manifest as pain or lameness in a limb and provide us with further valuable information. Always examine the brachial plexus region for pain, especially in the event of severe thoracic limb muscle atrophy. Remember that treatment with anti-inflammatories can mask the clinical signs and make the assessment of pain level inaccurate[3].

NEUROLOGICAL EXAMINATION

After establishing that you are dealing with a spinal problem, a neurological examination must be performed. A detailed neurological examination[7,11] is not within the scope of this article and is very seldom done in the initial short consultation with the owner. It is however useful to obtain some idea of neurological status of the patient, in order to discuss the diagnostic protocol with the owner.

A "screening" neurological examination consists of checking for a hyperpathic level, assessing conscious proprioception and testing reflexes including patella, cranial tibial, extensor carpi radialis, triceps, biceps, flexor, cutaneous and perineal, which help to localise the lesion. Occasionally caudal cervical lesions can cause atypical upper motor neuron signs to the thoracic limb. This is reportedly caused by decreased flexor tone in the relevant muscles. Assessing and understanding deep pain response is vital to the ultimate prognosis and owners usually require this information before conceding to the costs of the diagnostic modalities suggested.

DIAGNOSTIC IMAGING

Advanced diagnostic imaging modalities have greatly assisted the practitioner in making diagnoses in spinal patients, however these techniques are not a substitute for a thorough clinical work-up and good quality survey radiographs. Magnetic Resonance Imaging (MRI) examinations are much more likely to be diagnostic if the clinical examination has narrowed down the area of interest to a small segment of the spinal cord. Smaller thickness slices can then be utilised to identify the lesion. Understanding the scope of MRI verses conventional myelography is important; this will be dealt with in more detail under the individual conditions.

Collection of cerebrospinal fluid (CSF) at time of myelogram is easy and can be extremely useful especially for inflammatory, infectious and neoplastic conditions[11]. It should routinely be sent for analysis, unless a diagnosis can be confirmed by the myelogram.

HOW DO WE USE THIS INFORMATION?

Spinal conditions that are easily confused in every day practice include: intervertebral disc prolapse, fibrocartilagenous infarction, spinal tumours, congenital cystic conditions, caudal cervical spondylomyelopathies, brachial plexus tumours, degenerative myelopathy and immune-mediated meningitis[1,3,7,9,11]. These are discussed below with emphasis on the patterns observed and the diagnostic tools used to confirm them. Other unrelated or less common conditions that can present with exactly the same symptoms are listed for completeness.

Intervertebral Disc Prolapse (Hansen Type 1) - This condition is relatively breed specific with Dachshunds, Malteses, Pekineses being the most commonly affected, but we also see it in Bassets, Cocker spaniels, Beagles and occasionally in the large breed dogs[2,4,8,12]. These dogs present with acute spinal pain in either the neck or thoracolumbar region and a definite hyperpathic level. The source of this pain is discogenic, meningeal or due to nerve root irritation (radicular)[12]. Neurological deficits may be present and commonly affect the thoracic limbs in cervical lesions and the pelvic limbs in thoracolumbar cases. Patients are typically between 2 and 6 years of age and may have been showing signs of spinal pain for a few weeks or even months prior to presentation. Be warned that dogs with signs of spinal pain only, often have very large spinal cord compressions on myelogram.

Survey radiographs reveal numerous calcified disc spaces and possibly one particularly narrowed disc space, which hopefully coincides with the hyperpathic level detected. Suspected cases require rapid intervention with myelography still being one of the most accessible and accurate methods of diagnosis[10]. MRI is an outstanding modality when more subtle lesions are suspected.

Fibrocartilagenous embolism / infarction (FCE) – The presentation and history of these cases is very different from those of dogs with intervertebral disc prolapse. Large breed dogs are more commonly affected, whilst those breeds prone to Type 1 disc prolapse, are seldom affected. Owners report that dog was active, yelped once and then showed sudden paresis in one or both pelvic limbs. The condition is usually non-painful as the lesion is intramedullary and this has no nociceptive fibres[9]. Neurological deficits characteristically deteriorate rapidly for the first 24 hours to complete uni- or bilateral limb paresis with or without the presence of deep pain sensation. Initial loss of deep pain sensation carries a poor prognosis. Survey radiographs are non-specific and CSF is often negative or may show a slight increase in protein. Myelogram sometimes show mild, localised spinal cord swelling that doesn't necessarily correspond with a disc space. Dogs with this condition often deteriorate neurologically after a myelogram. Early treatment with corticosteroids may be indicated to reduce inflammation. Dogs should be strictly cage rested for 1-2 weeks and receive good nursing care[5,7]. Improvement usually occurs in the first few days, but full functional recovery may take 3-4 weeks.

Spinal tumours – These lesions classically show a progressive onset of clinical signs, although occasionally acute paresis develops, which can cause confusion with intervertebral disc prolapses[7,9.] Dogs are typically older, although a handful of spinal tumours do occur in young patients. Spinal tumours are usually painful due to periosteal or nerve root irritation[9]. Tumours affecting the spinal cord are classified as primary or metastatic and then according to location as extradural, intradural, extramedullary or intramedullary[11]. Myelographic findings can be quite similar to those of disc prolapse, however subtle clues may be present ie. Loss of vertebral floor on survey radiographs, compressive lesions that don't correspond with a disc space or attenuation of the dorsal contrast column, irregular attenuation of the contrast column or attenuation spread out over two to three vertebral spaces. Be aware of the fact that ipsilateral Horner's syndrome can occasionally be caused by lesions affecting the T1-3 segment[9].

Congenital vertebral abnormalities and spinal dysraphism – Vertebral abnormalities can usually be identified on good survey radiographs, whereas the cystic conditions require a myelogram or MRI. The utilisation of MRI as a diagnostic tool in veterinary medicine has resulted in a much higher proportion of congenital abnormalities being detected. Dysraphic conditions result from failure of normal closure of the neural tube and may affect the brain or spinal cord[7]. Lesions include: syringomyelia or hydromyelia, arachnoid cysts, intraspinal ganglion or synovial cysts, hemi- or block vertebra and spina bifida. These lesions are often incidental findings, but may result in progressive neurological deterioration in young dogs. Accurate localisation and diagnosis of these conditions in affected dogs, can lead to surgical resection or decompression with a favourable prognosis.

Brachial plexus tumours – The brachial plexus is the collective name for the lower motor neuron segments of C6-T2, which innervate the shoulder and thoracic limb[13]. The most noticeable characteristic of cases with nerve sheath tumours of the brachial plexus is severe muscle atrophy of the affected limb. These cases suffer from a vague lameness of undetermined origin, often show pain in the region of the shoulder joint and are extremely painful on palpation of the axilla. In severe cases tumours can even be palpated as they traverse cranial to the first rib. MRI examination is the most accurate diagnostic modality for these tumours, but technicians have to be informed of what you are looking for. Early diagnosis is the most important factor in successful treatment.

Degenerative myelopathy – This condition is caused by degeneration of the axons and myelin sheaths of the white matter[7,11]. It is reported in older, large breed dogs with German Shepherds being over-represented. It is a slow, progressive condition with no spinal hyperpathia. Owners tend to notice clinical signs of weakness and ataxia in the pelvic limbs, which show limited response to anti-inflammatories. Survey radiographs and myelograms are non-specific. MRI may pick up a change in signal intensity within the spinal cord. This is usually a “rule out” diagnosis with no specific treatment currently available and the condition carries a very poor prognosis[7].

Immune mediated meningitis – Sometimes referred to as corticosteroid-responsive meningitis or GME (Granulomatous Meningoencephalitis), this condition occurs in young, medium to large breed

dogs. Clinical signs include apparent, severe spinal pain with muscle spasms and reluctance to move. Occasionally neurological deficits may be present. CSF analysis is diagnostic with increased protein and white blood cell levels. A dramatic response is achieved with corticosteroids, but signs tend to reoccur in about fifty percent of animals[11].

Miscellaneous –Other conditions that have been confused with intervertebral disc disease, but that have not been discussed in this paper include trauma, discospondylitis, spondylosis deformans, caudal cervical sondylomyelopathy, dilated cardiomyopathy, lysosomal storage diseases in Border Collies and tumours of the prostate or other organs adjacent to the vertebral column.

CONCLUSIONS

Standardising the approach to cases that present with spinal pain and / or neurological deficits, means that patterns of characteristic clinical signs will immerge and be easier to recognise. Recognition of the disease process allows us to plan a logical diagnostic protocol and to make a diagnosis in the majority of cases.

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