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COMMON NON-SURGICAL DISEASES OF THE CANINE SPINE
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Introduction
The disease of the canine spine can be classified based on whether the primary presenting complaint is spinal pain or neurological deficits. Clinically important spinal cord diseases presenting with pain:
- Meningitis
- Discospondylitis
- Intervertebral disc disease*
- Lumbosacral syndrome*
- Bone tumour*
- Vertebral malformations (atlanto-axial subluxation)*
* may progress to develop neurological deficits

Clinically important spinal cord diseases presenting with neurological deficits:
- Intervertebral disc disease
- Fibrocartilaginous embolism
- Lumbosacral syndrome
- Trauma
- Neoplasia
- Vertebral malformations (atlanto-axial subluxation, hemivertebrae)
- Chronic degenerative radiculomyelopathy (CDRM or degenerative myelopathy) in the GSD

Meningitis
Causes of meningitis in dogs and cats include:
- Immune mediated form commonest: steroid responsive meningitis / arteritis (SRMA)
- [Bacterial: rapidly fatal]
- [Viral (distemper)]
- [Protozoal (Toxoplasma / Neospora)]

Breeds affected by SRMA:
- Large pure breeds (Pyrenean mountain dog, Newfoundland, pointer, Weimaraner, Vizla)
- Beagles

Clinical signs of SRMA
Typically a waxing and waning course, associated with bouts when the dog appears unwell, demonstrates pyrexia, marked cervical pain and inappetance.

Diagnosis
CSF tap is definitive, with evidence of elevated white cell counts, primarily consisting of large numbers of non-degenerate neutrophils. Haematology / biochemistry may support inflammation but are non-specific. Advanced imaging (besides MRI) is usually normal and myelography is contra-indicated.

Treatment
Prednisolone: tapering from an initial immunosuppressive dose for 2 to 4 weeks. Continue tapering the dose over 4 to 6 months. Some patients require longer treatment or different drugs. May be self limiting after 12-18 months.

Discospondylitis
Discospondylitis is a concurrent infection of the intervertebral disk and of the adjacent vertebral bodies (vertebral osteomyelitis). Discospondylitis is more common in middle-aged large/giant breed dogs. Males are more commonly affected than females (ratio of 2:1). The most common sites affected are mid-thoracic vertebrae; C6-C7 and L7-S1.

Aetiology
Discospondylitis is a septic condition, usually spread by haematogenous route. It can also be secondary to penetrating wounds, foreign bodies, etc. Commonly encountered infectious agents are coagulase-positive Staphylococci, Streptococcus species, Brucella canis and E. coli.

Clinical presentation
Signs are often non-specific in the early stages. Spinal pain is usually present, while systemic signs (fever, weight loss) are reported in only 30% of cases. With progression, degeneration of the disc can lead to protrusion/extrusion.

Diagnosis
Leukocytosis is usually absent. CSF analysis is often normal. Blood and urine cultures are reported to be positive in 45-75% and 25-50% of cases, respectively. Brucella titres should be obtained in intact animals in endemic regions. Radiographic demonstration of discospondylitis is usually sufficient for diagnosis, but radiographic changes may not appear for up to 3 weeks. Magnetic resonance imaging is the diagnostic procedure of choice.

Treatment
Treatment of discospondylitis is prolonged (2 to 4 months) and relapses are not uncommon. Empirical treatment can be initiated after all samples (urine, blood, disc aspirate) have been taken for culture and sensitivity. Cage rest is important to minimize the risk of pathologic fracture. Analgesia should be provided.

Intervertebral disc disease
Intervertebral disc disease is an important cause of canine neurological disease, accounting for over 2% of all diseases diagnosed in the dog. Affected patients...
Physiotherapy can therefore be started as soon as the treatment is by nursing care and early instigation of physiotherapy is very beneficial. As there is no residual spinal cord compression there is no need of physiotherapy. Treatment is by nursing care and early instigation of physiotherapy.

Residual spinal cord compression

There is no need of physiotherapy. Treatment is by nursing care and early instigation of physiotherapy.

Diagnosis

The etiology of lumbosacral syndrome is confirmed.

Lumbosacral syndrome

Lumbosacral syndrome comprises diseases affecting the caudal lumbar (L4-L7) and sacral segments of the spinal cord, as well as the nerve roots supplied by these spinal cord segments forming the cauda equina. The nerves affected by lumbosacral syndrome may include the femoral, sciatic, obturator, pudendal, pelvic and coccygeal nerves and result in variable involvement of the pelvic limbs, tail, bladder, anal sphincter and perineum.

Clinical signs

The primary clinical signs of lumbosacral syndrome (the presence or absence of the individual clinical signs will depend on the underlying lesion) can roughly be subdivided into 3 categories:

Neurological deficits pertaining to the pelvic limbs:
- Pelvic limb paresis or ataxia
- Decreased lumbosacral trunk reflexes in the pelvic limb
- Pelvic limb or hip region muscle atrophy

Neurological deficits pertaining to the sacral and coccygeal nerve roots:
- Decrease or loss of the anal reflex and dilation of the anal sphincter
- Decreased or absent perineal reflexes
- Urinary incontinence
- Faecal incontinence
- Hypoesthesia or analgesia of the perineal region, pelvic limb or tail
- Tail paralysis

Pain-related clinical signs:
- Pain over the lumbosacral region
- Pain over the lumbosacral region
- Reduced activity, in particular reluctance to jump and climb stairs
- Nerve root signature (referred pain due to nerve root entrapment)

Causes

The causes of lumbosacral syndrome are varied and include (based on the DAMNIT classification):
- Degenerative: lumbosacral stenosis, intervertebral disc disease, spinal synovial cysts
- Developmental: spina bifida, sacrocaudal dysgenesis, dermoid sinus, myelodysplasia, transitional lumbar or sacral vertebrae, osteochondritis dissecans
- Angiopathic: aortic ischaemic myelopathy, fibrocartilaginous embolism, haemorrhage, ascending and descending syndrome
- Neoplastic: primary and secondary spinal cord tumours, nerve root tumours
- Inflammatory and Infectious: abscessation, discospondylitis, (granulomatous meningoencephalomyelitis), (mycotic diseases), (parasitic migration)
- Trauma: spinal trauma

Prognosis

The prognosis is very good for most diseases affecting the spinal cord. However, some diseases, such as degenerative diseases, may have a poor prognosis.

Treatment

Treatment is by nursing care and early instigation of physiotherapy. As there is no residual spinal cord compression there is no need for decompressive surgery or for strict cage rest, and physiotherapy can therefore be started as soon as the diagnosis is confirmed.
Neurology

Of these causes of lumbosacral syndrome, the most important is lumbosacral stenosis.

**Lumbosacral stenosis**

Lumbosacral stenosis is due to stenosis of the vertebral canal at the level of the lumbosacral junction with consequent compression of the nerve roots. In some cases, the stenosis may be lateralised and only affect one intervertebral foramen. The most common cause of lumbosacral stenosis is a Hansen type-II intervertebral disc extrusion at the level of the lumbosacral junction, but other causes have been reported. The condition is most common in large breed dogs, often working dogs. The disease tends to occur in middle-aged dogs, with an increased incidence in male dogs (with a male to female ratio of 4:1). German shepherd dogs, boxers and Rottweilers are over-represented. Affected dogs demonstrate one or more of the features of lumbosacral syndrome, with pain over the lumbosacral region (particularly on palpation and lumbosacral hyperextension) being one of the most consistent clinical signs.

**Trauma**

Spinal trauma is a common cause of spinal dysfunction and includes endogenous and exogenous causes. Exogenous causes are most often secondary to road traffic accident or fall from a height. Vertebræ can be divided in three anatomical compartments:

- Ventral: ventral longitudinal ligament, ventral part of the annulus fibrosus and ventral vertebral body
- Middle: dorsal portion of the annulus fibrosus, dorsal longitudinal ligament and dorsal vertebral body
- Dorsal: pedicles, vertebral arches, articular facets, joint capsules, spinous process and interspinous ligament

**Treatment**

Assessment of instability: considered unstable if there is a lesion of two or more compartments. The aim of spinal trauma treatment is to: 1) prevent further mechanical damage to the spinal cord; and 2) treat/prevent secondary pathophysiological events. The choice of treatment (conservative or surgical) depends on severity of the lesion (especially number of vertebral compartments involved), owner’s finance, surgeon expertise and preference.

**Neoplasia**

Neoplasia affecting the spinal cord is common in both dogs and cats and the exact clinical signs depend on the localisation of the lesion, with respect to the level of the spinal cord affected (e.g. cervical versus caudal lumbar). Neoplasia of the spine is classified both with respect to the physical localisation in relation to the meninges and spinal cord (into extradural, intradural but extramedullary and intramedullary).

**Vertebral malformations (Atlanto-axial subluxation, hemivertebrae)**

*Atlanto-axial subluxation*

Toy and small breeds such as the Chihuahua and Yorkshire terrier are at highest risk as a result of failure of development of the dens (aplasia or hypoplasia). Onset of clinical signs in dogs with the congenital form usually occurs in young animals, although the problem can develop at any age, especially following minor trauma. Clinical signs are those associated with cervical spinal cord compression: pain, ataxia and/or upper motor neuron paresis/paralysis.

**Malformations of the vertebral body and disc**

Most of these malformations are incidental findings and do not cause any significant neurological deficits, however in some cases, the spinal canal can be severely reduced, causing compression of the spinal cord.

**Malformations of the vertebral arch and spinal cord**

*Spina bifida*

Incomplete closure of the vertebral arch. It is most commonly reported in English bulldogs and can cause paraparesis and urinary and faecal incontinence.

**Congenital syringomyelia and spinal dysraphism (myelodyplasia)**

Malformations of the spinal cord have been described in Weimaraner and other breeds of dogs.

*Sacro-coccygeal dysgenesis*

Reported in the Manx cat as well as pugs and bulldogs. The clinical signs include paraparesis and urinary/faecal incontinence.

**Chronic degenerative radiculomyelopathy (CDRM or degenerative myelopathy)**

Chronic degenerative radiculomyelopathy (CDRM) is a degenerative neurological disorder resulting in progressive pelvic limb ataxia and paresis in older large breed dogs, particularly the German shepherd dog. The underlying pathogenesis is unclear, but is likely to have a genetic basis.

*Clinical signs*

Affected dogs are generally over six years of age and the mean age of onset is around 9-years of age. Clinically, dogs present with a gradual progression of an initial insidious pelvic limb ataxia. The neurological abnormalities are bilateral and usually symmetrical (although mild asymmetry is not uncommon). The lesion is diffuse and there are therefore no focal localising signs, such as focal pain or cutaneous trunk reflex cut-off. Due to involvement of the dorsal roots, the patellar reflex is decreased or lost in about 25% of cases. The duration of clinical disease prior to euthanasia on humane grounds
is around 6 to 18 months.

Diagnosis
There is currently no in vivo diagnostic test; definitive diagnosis requires neuropathological examination.

Treatment
A variety of treatment regimes have been proposed, but there is no reliable evidence to suggest that any of these treatments offer any benefit. Concurrent osteoarthritis will, however, exacerbate the abnormal pelvic limb gait, and treatment with NSAIDs may result in apparent temporary improvement.