PARAPLEGIA AND ITS MANAGEMENT IN COMPANION ANIMALS

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Paraplegia is the loss of voluntary motor function of both hind limbs and is characterized by dragging of the hind quarters on the ground by the patient and may also be associated with paralysis of the muscles controlling defecation and urination. The condition is often a challenging one for a practicing veterinarian, with many of the patients having to be put to sleep or dying on their own after undergoing a lot of suffering.

Conditions causing paraplegia in companion animals

Injuries or diseases of the spinal cord may cause paraplegia or quadriplegia (paralysis of both fore and hind limbs) depending on the site affected. In general it can be said that those affecting the caudal thoracic and the lumbar segments of the spinal cord result in paraplegia. One of the most commonly encountered causes for paraplegia in dogs is intervertebral disc disease, which affects chondrodystrophoid breeds of dogs like the Dachshund usually when they are 3-6 years old and larger breeds of dogs when they are older. Traumatic injuries of the vertebral column like fractures and dislocations due to falling from heights, automobile accidents, attack by other animals and man, projectiles like bullets (gun shot injuries) and trauma from blunt objects falling on the back can also cause damage to the spinal cord. Degenerative myelopathy, seen in large breeds of dogs especially German Shepherds, can usually cause paraparesis (partial loss of voluntary motor function of the hind limbs) and may be associated with paraplegia in advanced cases. Discospondylitis and neoplasia involving the spinal cord or the vertebral column can also cause paraplegia. Infectious diseases like rabies and distemper may bring about paraplegia due to inflammatory and degenerative damages to the spinal cord.

Diagnosis

The clinical signs are obvious with the animal unable to raise the hindquarters from the ground an1d dragging the hind limbs on the floor, with or without urinary and fecal incontinence. A detailed neurological examination would help to assess the severity of the spinal cord damage and to localize the lesion. Assessment of the severity of the damage to the spinal cord is important in providing a prognosis regarding chances of recovery. Patients with very severe damage to the spinal cord may not have deep pain sensation in the digits of the hind limbs, which indicate a poor prognosis especially if it had been absent for more than 48 hours. A thorough neurological examination also helps rule out orthopaedic disorders like advanced cases of bilateral hip dysplasia which may also be presented with clinical signs suggestive of spinal cord damage. Plain radiography and myelography are highly useful and affordable imaging techniques for the diagnosis of spinal disorders in veterinary practice. CT and MRI, though highly efficient in helping make a definitive diagnosis, may be uneconomical in veterinary practice.

Treatment

When a paraplegic patient is presented, it should be assured that further damage to the spinal cord is avoided by preventing undesirable movements of the spinal column. It is advisable to shift the patient on a flat, hard surfaced board or stretcher. Steps should be taken to start the appropriate treatment at the earliest as any delay will cause progress of degenerative changes in the spinal cord. Other than the initial physical

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damage, compressive injuries can lead to secondary damages to the spinal cord due to progressive ischemia following spinal cord inflammation and due to peroxidative damage to the nerve membranes by free radicals.

Corticosteroids in spinal cord injury

Corticosteroids play an important role in the treatment of paraplegia. As per the universally accepted protocol acute spinal cord injury requires the administration of methylprednisolone sodium succinate (Solu-Medrol®, Pharmacia, Belgium) within eight hours of injury. The suggested dosage of the drug is an initial intravenous bolus of 30 mg/kg of the drug followed by 15 mg/kg intravenously 2-6 hours later, and then continued at the rate of 2.5 mg/kg intravenously every hour for the next 24-48 hours. Other than the anti inflammatory, analgesic and membrane stabilizing actions of corticosteroids, this drug also acts as a scavenger of free radicals that can cause peroxidative damage to nerve cell membranes.

Another drug that has been found to be highly effective in the treatment of paraplegia due to concussive or mildly compressive injuries of the spinal cord is methylprednisolone acetate (Depo-Medrol®, Pharmacia, Belgium). It is available as a slow releasing preparation which ensures the availability of the drug locally near the site of injury for 1 to 3 weeks following deposition. This drug has been used successfully in paraplegic dogs and cats at the rate of 2 mg per kg body weight epidurally at the lumbosacral junction at weekly intervals. The drug has also been used by this route for the treatment of lumbosacral radiculopathies in human patients in USA. Even though the epidural administration of corticosteroids has been alleged to cause complications like arachnoiditis, meningitis and epidural abscessation, studies conducted in cats, rats and rabbits have proved otherwise. Abscessation can be prevented by administration of the drug under strictly aseptic conditions. Polyethylene glycol, an adjunct of this preparation, is a detergent and alcohol and has been accused to cause damage to the myelin sheath. But, recent reports from Purdue University, USA, claim that this polymer enhanced neurological recovery in clinical cases of spinal cord injury in dogs when given intravenously. There were earlier reports that the agent improved the electrical conductivity of damaged spinal cord when applied directly on to experimentally induced spinal cord injuries in guinea pigs. From clinical experience in Bangalore Veterinary College and the experience of many other practicing veterinarians, this modality appears to be an effective, economical and convenient means of treatment of paraplegia due to concussive and mildly compressive injuries to the spinal cord. However, the use of this drug by epidural route should be attempted at the personal risk of the veterinarian as the manufacturer does not recommend its use epidurally or intrathecally.

Even though corticosteroids are inevitable in the treatment of spinal cord injuries, they can cause gastrointestinal bleeding (ulceration or perforation of the gastrointestinal tract) in as many as 15% of neurosurgical patients, with a mortality rate of up to 2% according to studies conducted in USA. This has caused them to be referred to as "double edged swords" in the treatment of spinal cord injuries. Among them dexamethasone is said to be most likely to cause these problems. Moreover, there is little evidence that this drug has beneficial effects in spinal injury. Hence routine dexamethasone therapy in spinal patients is strongly discouraged. However, if it cannot be avoided due to lack of availability of the other drugs it can be used at the rate of 2-3 mg/kg intravenously initially followed in 6 to 8 hours by 1mg/kg subcutaneously or intravenously two to three times a day for 24 hours, and then continued at the rate of 0.2 mg/kg intravenously or subcutaneously two to three times a day for three to five days.

Corticosteroids should never be used in conjunction with NSAIDS and should be used with extreme caution in patients who have been previously treated with these drugs as the potential for gastrointestinal ulceration and perforation get multiplied under these circumstances.

CONSERVATIVE MANAGEMENT

After initiation of the corticosteroid therapy, high potency vitamin B complex preparations like Neurobion Forte® (Merck Ltd., Mumbai) may be administered. Methylcobalamin, the neurologically active form of vitamin B12 may be administered as it has been found to be effective in neuron regeneration in high doses in animal studies. Vitamin E has been recommended for degenerative myelopathy at the rate of 2000 IU per day in German Shepherd Dogs.

It is always advisable to restrict the

movements of the paraplegic patient. The animal may be put under cage rest. In mild cases of fractures of the vertebral column application of external splints on the back may be useful. Physiotherapy in the form of massaging the muscles and flexion and extension of the limbs may help reduce muscular atrophy. Paraplegic patients that do not have fractures or dislocations of the spinal column can be provided non concussive exercises like swimming. When the urinary bladder is paralyzed, urine has to be drained by pressing the bladder trans-abdominally 3 to 4 times a day. The hindquarters have to be kept clean and soiling of the skin and hair with urine has to be avoided as it will lead to urine scalds. In long haired animals it is advisable to clip or shave the hair from the tail and the thighs to permit easy cleaning and drying of the skin. The patients have to be turned every two hours and soft bedding provided to prevent the formation of bed sores.

In cases where surgery cannot be attempted, or in cases where surgery has failed to provide relief, the patients can be rehabilitated on wheel carts. Most of these patients have been found to adapt well to the life on wheel cart. Ready made carts that suit different sized patients are available in foreign countries. However, in India they are not readily available and may have to be fabricated locally.

SURGICAL TREATMENT

Spinal surgery has been practiced in dogs and cats in western countries for over the past 50 years. Success rates can be high when surgery is attempted without delay and in cases where the degree of damage to the spinal cord is not too severe.

Compressive lesions can be treated by decompressive procedures like dorsal laminectomy, hemilaminectomy and mini hemilaminectomy. These procedures can be used as the sole methods of treatment in intervertebral disc disease, though dorsal laminectomy has lost favour nowadays owing to the destabilizing effect it has on the spinal column. Fenestration of the intervertebral disc is another technique used for treatment of intervertebral disc disease.

Different techniques are available for the treatment of fractures and dislocations of the vertebral column. Dorsal spinal plating using stainless steel or plastic plates, vertebral body plating, combined vertebral body and dorsal spinal plating, dorsal spinal stapling and its various modifications, vertebral body cross pinning and external skeletal fixation alone or in combination with plate fixation are some of the techniques that have been used successfully in veterinary practice. Techniques like dorsal spinal stapling can be performed in any average hospital with basic orthopaedic instrumentation.

Summary

Paraplegia in companion animals is one pitiable condition that causes a lot of suffering for the patients and discomfort to the owners. This article discusses the aetiology, diagnosis and treatment of paraplegia in companion animals. ❑

VIEWS

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