



Use of mesenchymal stem cells from adipose tissue functional recovery of dog with chronic spinal cord injury by disc herniation: a case report

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Abstract

The spinal cord is one of the most important and sensitive organ systems in the body. If it is damaged, the nerve cells do not regenerate but are replaced with fibrous or scar tissue. Spinal cord injuries usually result in permanent, irreversible damage. The clinical incidence of intervertebral disc disease has been reported to be higher in the chondrodystrophoid breeds of dogs although disc degeneration can occur in all breeds. This study aims to describe the successful treatment and functional recovery of a dog with chronic spinal cord injury and herniated disc treated with ADMSC application via epidural catheter. A 3 year old male dog, breed Lhasa Apso, was admitted showing signs of a chronic spinal cord injury caused by an old herniated disc and with the following clinical state: pelvic limb paraparesis with presence of deep pain, increase spinal reflexes patellar, sciatic and tibia-cranial, small voluntary movement, and the absence of proprioception and pain sensation surface. The thoraxical limbs worked fine while the pelvic was dragged when the dog tried to walk. The urinary bladder could only be emptied with manual compression. The dog owner said that eight months before the animal admittance it had suffered a sudden paralysis of hind limbs without any apparent cause. The dog was treated at an emergency service, where he received analgesics and nonsteroidal anti-inflammatory. A tomography showed severe medullar compression with a great portion of medullar material extrusion at the thoracolumbar (T12-T13) region. Back then, the dog was showing pelvic limb paralysis without deep pain sensation. Surgical correction was performed 3 days after the injury through hemilaminectomy associated with fenestration to remove the herniated disc. After the surgery the dog received analgesics, anti-inflammatory and antibiotic prophylaxis, and physical therapy. Such treatment resulted in the return of deep pain and slight voluntary movement, but the dog remained unable to stand and walk although during eight months having undergone physiotherapy and acupuncture. The application was directed on the lesion using an epidural catheter (BD®Perisafe 20G) introduced with a lumbosacral (L7-S1) puncture and its end was positioned in the epidural space at the T12 vertebra. A total of 2×10^6 ADMSC were used mixed with a saline solution. After the procedure the animal continued with the physical therapy rehabilitation program to enhance neurological stimulation. In the first two weeks of the postoperative the intensification of voluntary movement

and return of superficial pain was observed. In 21 days the animal had return of proprioception with consequent locomotor function restored with only mild ataxia, but urinary function remained compromised. According to the results shown we can conclude that adipose mesenchymal stem cells were capable of reversing the paralysis and to recover functions.