

Acute Intervertebral Disc Protrusion in a Korean Domestic Shorthaired Cat: Clinical and MRI Findings

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Abstract : Signalment: A 7-month-old, female domestic shorthaired cat was presented for acute pelvic limb paraparesis. Results: There was no abnormality on survey radiographs and blood analysis, however neurological examination revealed proprioception positioning and hopping was absent in the pelvic limbs. Also, anal tone and perineal sensation were reduced. Magnetic resonance (MR) imaging showed nucleus pulposus dehydration and disc protrusion at T12-T13. Ill-defined diffuse lesion was found at T10-L2 level and it showed isointense on T1-weighted images and hyperintense on T2-weighted and FLAIR images. This lesion was considered as edematous lesion secondary to disc protrusion. The presumptive diagnosis was focal spinal cord edema associated with intervertebral disc protrusion. A traumatic aetiology was suspected. The cat was treated corticosteroids and analgesic and clinical sign improved following 9 days of treatment. Clinical relevance : Intervertebral disc protrusion is rare disease in a cat. However, it could be considered as a cause of paraparesis in cats.

Key words : cat, intervertebral disc protrusion, pelvic limb paraparesis.

Introduction

Intervertebral disc disease (IVDD) in cats is uncommon compared to dogs (10). Traumatic intervertebral disc disease counts for only 4% of all the spinal cord disease of cats (9), while another study indicated that of 92 cats undergoing spinal magnetic resonance imaging, only five were diagnosed with IVDD (1). IVDD is a frequently recognised neurological problem of dogs, and numerous reports exist regarding aetiology and pathogenesis of IVDD in this species. It has been known that the clinical and imaging features of intervertebral disc disease in the cat have similarities with that of the disease in dogs (6). As in dogs, there are two types of intervertebral disc disease in cats : intervertebral disc extrusion (IVDE), or Hansen type I, and intervertebral disc protrusion (IVDP), or Hansen type II. However, not like dogs, very little have been known about etiology and characteristics of IVDE or IVDP of cats.

Since IVDD should be considered a possible cause of spinal cord dysfunction in cats, further information regarding features of this disease in cats is necessary. The purpose of this report is to describe the history, neurological signs, clinical and MR findings and outcome of a cat with intervertebral disc protrusion.

Case

A 7-month-old female Korean domestic shorthaired cat,

weighted 3 kg was referred with acute pelvic limb paraparesis. The onset of clinical sign was observed 5 days ago, the owner suspected that the clinical sign was started when the cat was startled at a dog and jumped in a hard cage. After the incidence, the cat showed abnormal gait and could not weight bear on the pelvic limb. The cat took non-steroid anti-inflammatory drug for 5 days at the clinic and there was a little improvement of clinical signs.

On blood analysis, the blood cell count and serum biochemistry profile analysis revealed no abnormalities. Also, general physical examination and survey radiography of the thorax and thoracolumbar spine revealed no significant findings. Myelography was not performed. On neurological examination, absence of hopping response and proprioception positioning on both pelvic limbs. On both pelvic limbs, superficial pain response was absent but deep pain was present. Gait abnormalities included paraparesis, more pronounced on the left, and ataxia of both hind legs. Also, anal tone and perineal sensation were reduced.

Magnetic resonance imaging of the thoracolumbar spine was performed on the day the cat referred to this hospital. MR examination was performed under general anesthesia. Anesthesia was induced with propofol at the dose of 6 mg/kg IV and maintained with isoflurane. A 0.3 Tesla low-field MRI scanner (Airis II, Hitachi, Japan) and human joint coil at Chungbuk University Veterinary Medical Center was used. In T2-weighted images there was a loss of the normal signal from the nucleus pulposus of the intervertebral disc at T12/13. The remaining disc was normal. Narrowing of the ventral subarachnoid space and slight dorsal displacement of the spinal cord at T12-13 was identified on sagittal images compatible with an extradural sign on the ventral aspect. The area

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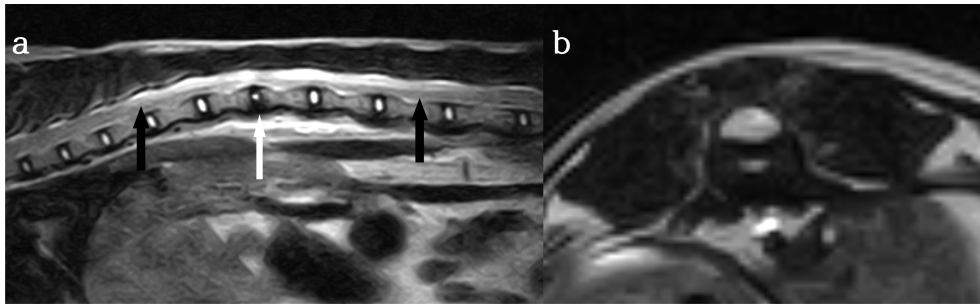


Fig 1. Magnetic resonance images. (a) Sagittal T2-weighted image showing disc protrusion at the level of T12-T13 (white arrow). The spinal cord from T10 to L2 had hyperintensity indicates spinal contusion (black arrows). (b) Transverse T2-weighted image with cross-sectional area of the spinal cord at the level of maximal dorsal compression (T12-T13).

of spinal cord from T10 to L2 had hyperintensity on sagittal T2-weighted and FLAIR image (Fig 1). The length of abnormal hyperintensity of the spinal cord ranged approximately 6 times the length of the L2 vertebral body. We speculated that this hyperintensity caused by edematous change of the spinal gray matter or hemorrhage.

The cat was treated with prednisolone (initially 1 mg/kg every 12 hours) using a reducing dose over a period of 5 weeks and tramadol 3 mg/kg BID for 5 weeks. The cat was hospitalized for 6 days and the clinical sign was improved constantly. After being discharged from the hospital, it treated only by medication. After 9 days of medication, it was able to walk on both pelvic limb. Only slight muscle atrophy of the left pelvic limb was observed at that time.

Discussion

Intervertebral disc disease in cats resulting in clinical signs of myelopathy has been reported previously, however the few reports of this disease in cats would suggest that the incidence of IVDD in cats is significantly lower than that in dogs. The most common type of spinal cord disease in cats is inflammatory/infectious disease (8). In one report, the incidence of feline IVDD was only 0.12% (10).

Intervertebral disc degeneration and dorsal protrusion is a common post-mortem finding in the cat (5). In a post-mortem survey found that dorsal disc protrusions occurred mainly in old cats over 15 years of age, where they were common and often multiple (4). The author concluded that dorsal intervertebral disc protrusion is a senile phenomenon in cats. In our case, however, the cat was only 7 months of age and we speculated that traumatic incidence might have triggered intervertebral disc protrusion rather than degenerative changes.

In our case, T12-T13 intervertebral disc was affected. It is likely that the increased incidence of IVDD at certain locations of the spine is associated with the stance configuration and range of the spine in the cat. One study shows the lower lumbar joints (L4-L7) are nearly maximally dorsiflexed and the joints from T10 to T13 are maximally ventroflexed, while the other joints are held midrange; this may explain the increased prevalence of IVDD at T12-L1 and L4-L6 in clinically affected cats (7). Also, cats owe their flexibility to their vertebral column being able to total torsion of almost 180°

and that most of the torsion is seen within a small range of the lower thoracic vertebrae from about T4 to T11. It is possible that the flexible area (T4-T11) less get involved in IVDD. In veterinary literature Hansen type II protrusion seems to be more common in the cervical region in cats without clinical relevance (6). However, another case study suggests that the probability of clinically significant disc protrusion seems to be higher in the thoracolumbar and lumbar area (3).

One study suggested that no narrowing of the disc space could be happened even though a large volume of disc material bulged into the spinal canal (11). In our case, although there was no apparent narrowing of disc space on radiography and MR images, spinal cord was compressed by disc protrusion.

There was extensive hyperintensity on sagittal T2-weighted and FLAIR image and we presumed it was edema or hemorrhage caused from spinal contusion induced by disc protrusion. Here is the limitation of this case study; we could not assure what caused the hyperintensity because our MRI scanner could not perform T2* sequence. However, there was evidence of spinal contusion in the MR images and we assumed that the cat had severe neurological deficits caused from the spinal contusion as well as the disc protrusion itself. Typically, contusive injury is associated with a rapid loss of neurological function, occurring during a period of seconds to minutes. However, in association with intervertebral disc herniation the clinically observable events may occur over a period of minutes to days, depending in the rate at which the nucleus extrudes (2).

Surgical decompression was not considered at first as the spinal compression was very mild. Corticosteroid medication and conservative therapy applied for more than 9 days and the neurological deficit of the cat disappeared gradually.

Conclusion

In conclusion, we have shown that the protrusion of a thoracic intervertebral disc protrusion can sometimes result in damage to the spinal cord resulting in neurological signs including paraparesis. Even though the thoracolumbar disc disease is infrequent in cats, intervertebral disc protrusion should be considered when the cat have a traumatic incidence and present neurological clinical signs.

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