



## CASE REPORT

### Treatment of Multiple Thoracolumbar Intervertebral Disc Disease using Electro-acupuncture and Oriental Herbal Medicine in a Dog

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#### ABSTRACT

A 4-year-old male Pekingese dog was admitted to the veterinary medical center, Chonbuk National University for evaluation of severe hind limbs ataxia, atrophy and paresis. Diagnosis based on physical examination, neurological assessment and computed tomogram (CT) indicated multiple thoracolumbar intervertebral disc disease (IVDD) throughout the thoracic and cranial lumbar spine. Traditional veterinary medicine (TVM) based diagnosis was kidney *yang* deficiency syndrome. Initial high dose prednisolone therapy (1.5 mg/kg PO, twice daily) did not show any significant improvement. The dog was then treated with electroacupuncture (EA) and oriental herbal medicine for 6 months, which significantly improved mobility, proprioception and spinal posture of the patient.

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#### INTRODUCTION

Traditional veterinary medicine (TVM) including acupuncture and herbal medicine are used as a conservative therapy in different ailments in animals and humans. The acupuncture activated pain inhibitory pathway and stimulated immune systems which change the physiological alteration of the body (Xie and Ortiz-Umpierre, 2006). Mechanisms of oriental herbal medicines have been studied (Park, 1997). In the veterinary medicine, the acupuncture have frequently used to neurological disease (Choi and Hill, 2009; Hayashi *et al.*, 2007a) such as intervertebral disc disease (IVDD) (Yang *et al.*, 2003).

Occurrence of thoracolumbar IVDD in the Pekingese varies from 14 to 47.5% (Ferreira *et al.*, 2002). The surgery is the first treatment option in most cases to decompress injured spinal cord and to prevent from secondary spinal damage through a removal of an extruded or protruded disc material or a blood clot. Surgical procedure for IVDD includes a fenestration, a dorsal laminectomy, a hemilaminectomy, a pediclectomy and a mini-hemilaminectomy (Scott and McKee, 1999). Steroid and anti-inflammatory agents are used in the patients unable for the surgery (Chan *et al.*, 2001). Thoracolumbar IVDD cases were classified according to degree of the protruded disc as 5 grades. The prognosis was able to predict by those classification and was good in the treated cases by surgical intervention (Hayashi *et al.*,

2007b; Scott and McKee, 1999). Reported post-surgical recovery and recurrence rate are 86 and 13-14.8%, respectively (Ferreira *et al.*, 2002) and average recovery time is 10.8 days (Ferreira *et al.*, 2002). Of the case of 34 dogs with thoracolumbar IVDD losing deep pain 20 dogs gained a deep pain within 2 weeks after laminectomy that performed within 24 hours from onset (Scott and McKee, 1999). The IVDD with multiple lesions in vertebrae has a difficulty in the aspect of surgery (Choi and Hill, 2009). Alternative therapy (Choi and Hill, 2009) including several mode of acupuncture (Hayashi *et al.*, 2007b) performed to improve the symptom of IVDD.

Musculoskeletal disease including IVDD was diagnosed as the *bi-syndrome* in TVM (Hayashi *et al.*, 2007b). Those of wind, cold, damp and heat *bi-syndrome*, cold *bi-syndrome* resulted from cold as primary pathogen. The invasion cold results in deficiency of *yang*, *yin* or both. As *bi-syndrome* progress to chronic steps, it develops into a bony *bi-syndrome*, called painful *bi-syndrome* by clinical sign with severe pain, which was classified with kidney *yin* deficiency, kidney *yang* deficiency or both. In the patient energy was lacking due to absence of kidney and also decreased energy by chronic progress (Choi and Hill, 2009). Kidney *yang* deficiency resulted from painful *bi-syndrome* was characterized by clinical signs such as the patient searches the warm places, has coldness of the back and extremities or defecates soft stool in cold (Moon and Lim, 2006). Although the thoracolumbar IVDD case with multiple

lesions in vertebrae can occur frequently, reported cases are rare. The case regarding to multifocal IVDD in cats was reported (Choi and Hill, 2009) but as far as could be ascertained no report of multifocal IVDD in dog is available. Therefore, this case report was worthy to suggest as combination EA with herbal medicine instead of surgery.

### A CASE STUDY

**History and clinical examinations:** A 4-year-old male intact Pekingese dog was admitted to the Veterinary Medical Center, Chonbuk National University for evaluation of severe hind limbs ataxia, atrophy and paresis. Historically, the patient developed pancreatitis at 1-year of age that resolved after treatment. The patient had a first episode of thoracolumbar IVDD at 2-year of age with back pain that resolved after steroidal therapy. When the patient was 4-year-old, the second episode of thoracolumbar IVDD was appeared. At that time, he had a marked paraplegia with an amyotrophy and loss of upper motor neuron activity in hind limbs. Clinical examination revealed loss of deep and superficial pain completely in hind limbs. A dyschezia and dysuria were also observed. Based on the history and clinical examination, thoracolumbar disk disease grade V was diagnosed.

**Diagnosis and Treatment Response:** The narrowed intervertebral spaces and radio-opaque materials were observed on X-ray. On the CT, hyperattenuative dorsal mixed protruding with extruding disc materials were observed which lies from T<sub>12</sub> to L<sub>6</sub> spinal segments (n=7). The most severe compression by centrally extruding intervertebral disc material was noted at L<sub>1-2</sub> (Fig. 1).



**Fig. 1:** Transverse computed tomography image multifocal canine IVDD at T<sub>9</sub>-L<sub>3</sub> (A: T<sub>9-10</sub>, B: T<sub>10-11</sub>, C: T<sub>11-12</sub>, D: T<sub>12-13</sub>, E: T<sub>13</sub>-L<sub>1</sub>, F: L<sub>1-2</sub>, G: L<sub>2-3</sub>, H: L<sub>4</sub>). IVDD which combined with Hansen type 1 and type 2 that multiple increasing the Hounsfield unit (HU) was observed from T<sub>9</sub> to L<sub>3</sub> on the CT image. Each disk materials were found on the left side. F: The most severe lesion was observed between L<sub>1</sub> and L<sub>2</sub> lesion which take the spinal space about 70% mid-ventrally (\*).



**Fig. 2:** Acupuncture Points: 1; GV-14, 2; BL-18, 3; BL-22, 4; BL-23, 5; GV-2-1, 6; BL-25, 7; BL-26, 8; BL-27, 9; BL-28, 10; GB-30, 11; GB-30, 12; GB-31, 13; BL-37, 14; GB-34, 15; ST-36, 16; BL-60, 17; KI-1.



**Fig. 3:** Chronological progress of motor function (A, B and C) following alternative treatment including dry needle acupuncture, electro-acupuncture, aqua-acupuncture, herbal medicine, swimming and antioxidant; follow up computed tomogram (D) after 6 months.

Initially, steroid therapy was performed. The surgery was not primary recommendation in this case as the patient was suffering from protruding disc materials extensively spread from T<sub>9</sub> to L<sub>6</sub>, the pathological lesions were uncertain and patient showed poor prognosis. Although this case was 4-year-old which was diagnosed for thoracolumbar IVDD at local hospital from 2 years ago, it has lesion of protrusion as Hansen type II. Initially methylprednisolone sodium succinate (MPSS) was administered as high dosage (30mg/kg). And then, prednisolone (PDS) 1.5 mg/kg, furosemide 1 mg/kg, spironolactone 1 mg/kg, ursodeoxy-cholic acid (UDCA) 10 mg/kg and vitamin B complex was administered twice a day, orally. The dog was treated with PDS (0.5 mg/kg PO, once daily) in a tapering dose for alleviating spinal cord damage for 1 month. An improvement of chief complaint, however, did not observe. The steroidal therapy for 1 month gave rise that alkaline phosphatase (ALP) value increased to 708 U/L (reference range from 20 to 150 U/L) and alanine transaminase (ALT) value

increased to 1604 U/L (reference range from 10 to 118 U/L). Promptly all of the administration was suspended. We decided to apply a TVM with guardian consent. TVM is mainly composed of electroacupuncture (EA) and oriental herbal medicine. As an ancillary therapy, swimming, anti-oxidant such as vitamin B complex and a reinforcing agent such as nandrolone decanoate 1.5mg/kg which administrated intramuscular once a week were performed. TVM diagnosis was performed by evaluation of clinical history and based on findings such as pattern of watching, listening, asking and touching and diagnosis of tongue and pulse. On the diagnosis of tongue, it was pale and wet condition. On the diagnosis of pulse, it was deep and weak. So, kidney *yang* deficiency syndrome resulted from painful *bi* syndrome was diagnosed by TVM. The acupuncture points and oriental herbs were selected based on TVM diagnosis and the author's clinical experience. The acupuncture points used in this case were as follows: BL (Bladder) -18, BL-22, BL-23, BL-25, BL-26, BL-27, BL-28, BL-37, BL-60, GB (Gallbladder) -30, GB-31, GB-34, GV-14, GV-2-1, ST (Stomach) -36 and KI (Kidney)-1 (Fig. 2). Pairs of acupuncture points were connected with an electrode to form a set, which was used at 30 Hz for 10 minutes, and then at 80 to 120 Hz for 10 minutes. GV-14 and GV-2-1 made up the first set, both sides BL-18 and KI-1 made up the second and the third sets, both sides BL-23 and ST-36 made up the fourth and the fifth sets. Aqua-acupuncture was performed injecting vitamin B<sub>12</sub> (Biodyl, Merial, Korea) at BL-23, GB-30, ST-36 and KI-1. The dog was positioned at a sternal recumbency. The animal underwent EA twice a week for 1 month, then once two weeks for 5 months, totally 18 times. The patient was continuously taken the EA once a month.

A Duhuoqisheng-tang (DHJST) was used to remove a wind and damp, to strengthen the *Qi*, energy, of liver and kidney, to promote the circulation of *Qi* and blood and to make the pain easier. DHJST was administered for 6 months. DHJST made into semi-solid marble form which was mixed with honey to make palatable.

As an ancillary treatment, the patient was swum by owner in the bathtub which was carried out to barely touch the bottom of the pool with patient's feet twice a week for 20 minute. Antioxidants such as omega-3, vitamin E, vitamin B complex, glucosamine and chondroitin sulfate were administered as adjunct therapy.

Based on the restoration of normal walk, defecation and urination with 6 month alternative therapy, a good outcome was noted in this case. The back pain was complete stop and deep pain and conscious proprioception returned. As a result of the alternative therapy, the patient showed favorable prognosis with ambulatory paraparesis as a thoracolumbar IVDD grade II. Although no evidence of noticeable improvement on the CT images (Fig. 3) could be noted, alternative medicine including EA and administrating DHJST might affect to tonify muscle tone and to promote *Qi* to liver and kidney.

## DISCUSSION

Some reports are available in the literature on the treatment of thoracolumbar IVDD in dogs (Choi and Hill, 2001; Ferreira *et al.*, 2002; Yang *et al.*, 2003; Hayashi *et al.*, 2007b). Alternative therapy including EA and DHJST

had a favorable prognosis on patients with unable to be operated spine. Reason that surgical treatment did not choose as first treatment was that patient had pathological lesions of intervertebral discs from T<sub>12</sub> to L<sub>6</sub> (n=7). Deep pain did not already respond. Several cases were reported which were multiple IVDD (Hayashi *et al.*, 2007a). On the result of the both imaging diagnosis and medical history, this case has mixed a Hansen type II with type I IVDD.

Although, surgery was chose as a primary option in case of thoracolumbar IVDD, acupuncture and herbal medicine was indicated when patients have multiple lesions in spine (Choi and Hill, 2009). Acupuncture could activate axonal regrowth and thus regeneration of destroyed axons in the spinal cord. And it was a potent anti-inflammatory treatment, because it might decrease local spinal inflammation, edema, vasodilation or constriction and histamine or kinin release. This would decrease scar tissue formation, cord compression or hypoxemia and pain (Yang *et al.*, 2003). Especially, EA covers a large part in alternative therapy and has a stronger effect than other type of acuapunctures (Hayashi *et al.*, 2007b; Choi and Hill, 2009). Although acupoints were depended on by experience of clinicians and condition of patients, a paper indicates the acupoints which proper to thoracolumbar IVDD (Chan *et al.*, 2001). In this case, Bladder (BL) Meridian (BL) was selected as acupoints which was effective in neurological problem including IVDD.

Formula of DHJST was chosen to expel wind and dampness, enhance kidney and liver energy, help *Qi* circulation and alleviate pain (Hayashi *et al.*, 2007a). It consisted of 16 herbs (Park, 1997). DHJST is used clinically when symptoms such as arthritis, degenerative disease, knee joint pain along with anemia and disorder of circulation appear for nourishing blood, strengthen body muscles, relieving pain and as anti-inflammation especially in case of *Bi* syndrome (Hayashi *et al.*, 2007a). A steroid therapy has a side effect such as liver damage and delaying the wound healing and is controversial about the curative influence of a drug in thoracolumbar IVDD (Yang *et al.*, 2003). This case also has an increasing value of liver enzymes when the steroidal therapy was performed. DHJST could intensify the liver function (Park, 1997). For the reason it was suitable to patients with worsen liver function.

During the follow up computed tomogram of spinal cord was found compressed by disk materials as ever. The discordance between the aspect of compression of intraspinal space and clinical symptoms did not clarify. It is considered alternative therapy including EA and administration of DHJST work invisibly through CT. Long term studies are needed to answer that why the primary lesions did not eliminate and to observe recurrence rates IVDD in EA and herbal medicine therapy. From the present case, it is considered that alternative therapy including combination of EA and DHJST seems a good primary treatment option in cases of multiple IVDD which are unable to undergo surgery.

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