

## An integrative therapy for paraplegia dog with ehrlichiosis†

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**ABSTRACT:** An eight-months-old male Golden Retriever was referred to Veterinary Teaching Hospital of IPB University with clinical signs of non-ambulatory paraplegia, tail paralysis, urinary and faecal incontinence, pale mucosa, and loss of sensory and motoric responses on both pelvic limbs. The hematology examination showed thrombocytopenia ( $125 \times 10^3/\mu\text{L}$ ), monocytopenia ( $0.09 \times 10^3/\mu\text{L}$ ), and no significant decreased of hematocrit (36.88%). Rapid diagnostic test and blood smears were positive for *Ehrlichia canis* infection. Abdominal sonogram showed splenomegaly and hepatomegaly with hepatic vessels dilatation. An integrative therapy was done using medications (vitamin B-complex, cyproheptadine, methylprednisolone, doxycycline, and Fundamin E<sup>®</sup>), herbal (Gui Pi Tang<sup>®</sup> and Fu Fang Ejiao Jiang<sup>®</sup>), acupuncture, micro-radar, and Tuina massage. The dog was able to walk and run after 10<sup>th</sup> session of the intensive treatment then discharged from the hospital after two months. One week after, the dog started dragging his toe. A customized shoe then made to prevent further injury to the affected limb. The acupuncture was continued once a week for the following two months. The dog is still able to walk and run at his last visit 5 months later. This shows that an integrative therapy can give a good performance in recovering ambulation of paraplegia dog with ehrlichiosis.

### Keywords:

acupuncture, conventional medicine, eastern medicine, ehrlichiosis, paraplegia.

## ■ INTRODUCTION

**History and anamnesis:** An eight-months-old male Golden Retriever, weighing 25kg, presented for pelvic limbs and tail paralysis. The owner reported that the dog suddenly cannot walk after playing with his fellow dogs at home and suspected lumbar trauma. The dog has not received any treatment for 2 weeks.

**Clinical findings:** The physical examination showed a general weakness, pale mucous, stiffness at both thoracic limbs, pelvic limbs and tail paralysis without signs of pain at the palpation along the vertebrae (Figure 1a). The heart rate was 122 beats per minute, respiration rate of 44 times per minute, and body temperature of 39°C. Several wounds found on his rear due to dragged pelvic limbs. Severe skin irritation on his abdominal and inguinal area was marked due to urinary and faecal incontinence. Neurological examination disclosed an alert mental status and non-ambulatory paraplegia with mild muscle atrophy at both pelvic limbs. Proprioceptive deficits were detected at all four limbs, but more severe in pelvic limbs. Patellar withdrawal, and anal reflexes were decreased.

## ■ MATERIAL AND METHODS

**Diagnostic tests:** No abnormalities found in the radiograph and blood chemistry examinations. The hematology examination showed thrombocytopenia ( $125 \times 10^3/\mu\text{L}$ ), monocytopenia ( $0.09 \times 10^3/\mu\text{L}$ ), and no significant decreased of hematocrit (36.88%). The blood smears and rapid tests were positive for *Ehrlichia canis* infection. Hepatomegaly and splenomegaly were significantly observed in dog's sonogram (Figure S1).

**Differential diagnosis and prognosis:** The diagnosis based on conventional medicine was non-ambulatory paraplegia and ehrlichiosis. In Traditional Chinese Veterinary Medicine (TCVM), this condition called local Qi and Blood stagnation at lumbar area leading to KID yin deficiency with blood deficiency. The prognosis was good due to young age and positive response towards the integrative therapy.

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**Treatments:** The dog was hospitalized and received vitamin B-complex (Neurobion® 200mcg/kg once per day PO) and cyproheptadine (Pronicy® 2mg/kg twice per day PO) for a week. Then the medication changed into methylprednisolone (2mg/kg twice per day PO), multivitamin (Fundamin E® one tablet daily), doxycycline (5mg/kg twice per day PO), and herbal Fu Fang Ejiao Jiang® (20mL per day PO) for 2 weeks. Gui Pi Tang® one tablet per day PO then used to replace Fu Fang Ejiao Jiang® for the following one month. Acupuncture, micro-radar, and Tuina massagewere delivered together, three times per week, for the first two months. Then it decreased into once per week for another two months after he discharged from the hospital. There were 40 acupoints chosen for this case, but one session of acupuncture only used up to 15-20 acupoints based on the patient's condition at that very moment of therapy (See Table S2.1 and Table S2.2 for the list of acupoints and herbal functions).

## RESULTS AND DISCUSSION

**Results:** The recovery process of integrative therapy can be seen in Figure 1. (b-f). The dog finally can stand, walk, and run on his own on 10<sup>th</sup> session and was discharged after 2 months (16 sessions of therapy). Then he came back one week later dragging his right pelvic limb. The skin around the paw was injured due to the friction against the ground. A customized shoe then designed for his right pelvic limb. The dog started wearing the customized shoe in January 2019 and showed a good recovery.



Figure 1 The recovery process of the dog: (a) first visit in July 2018, (b) after 10<sup>th</sup> acupuncture session, (c) dragging toe, (d) the customized shoe, (e) patient wore the customized shoe to prevent him from dragging the toe, (f) last visit in April 2019.

**Discussion:** Paraplegia can be defined as a complete loss of voluntary motor function in the pelvic limbs (Kornegay 1991). The differential diagnosis of paraplegia are acute intervertebral disk herniation, spinal trauma, and fibrocartilaginous embolic myelopathy (Casimiro da Costa 2009). The differential diagnosis can be confirmed by using myelography, computed tomography (CT), or magnetic resonance imaging (MRI) (Jeffery *et al.* 2016). In this case, the dog's condition was getting worse due to *E. canis* infection. Ehrlichiosis is one of the most important tick-borne zoonoses that affect dogs (Freire *et al.* 2009). Some neurological signs associated with ehrlichiosis are ataxia,

seizures, paraparesis or tetraparesis with upper or lower motor-neuron deficits, stupor, vestibular disease, and back or neck pain (Freire *et al.* 2009). We used the acupuncture as the main therapy for the dog. Acupuncture has the ability to reduce the pain due to its analgesic and anti-inflammatory effects and has been clinically proved to help recover ambulation in paralysis animals (Xie & Wedemeyer 2012). Meanwhile, the customized shoe was made to correct and conditioning the 'dragging toe' limb into a normal posture and gait as well as protect the nail and skin from the damage of being dragged along the ground.

## CONCLUSION

The combination of western (conventional) and eastern (Chinese) medicine, can be used to give greater results in a shorter amount of time in treating paraplegia dog with ehrlichiosis.

## ASSOCIATED CONTENT

### Supporting Information

†The sonogram, list of acupoints and herbal functions were submitted in PDF form as supporting information.

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## SUPPORTING INFORMATION

### **An integrative therapy for paraplegia dog with ehrlichiosis**

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### S 1. Sonogram of the dog

Figure S1 showed the the sonogram of the patient. Hepatomegaly and splenomegaly were significantly observed as a concequence and also an indicator of blood parasite infection. Vessel dilatation can also be seen in both liver and spleen.

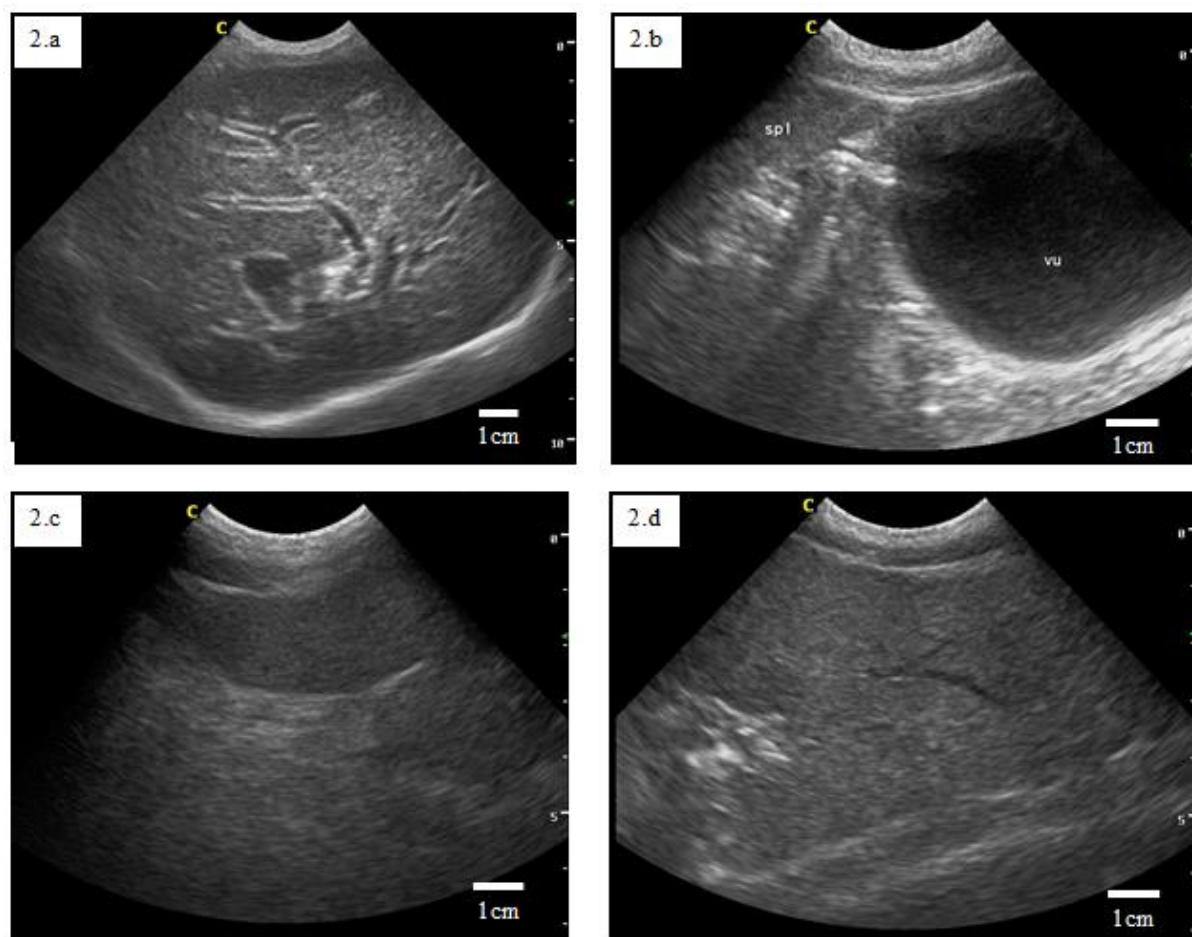


Figure S1. The sonogram of the dog: (a) hepatomegaly with hepatic vessels dilatation, and (b,c,d) splenomegaly.

## S2. List of acupoints and its function

Table S2.1 showed the acupoints chosen and used in this case. There were 40 acupoints chosen, but in one session of therapy we only used about 15 to 20 acupoints, based on the patient's condition at that very moment. The clinical indication and function of each acupoints can also be seen in Table S2.1.

Table S2.1. List of acupoints and its function

No	Acupoint	Clinical Indication (s) or Function (s)
1	<i>Bai-hui</i>	Diarrhea, constipation, IVDD, paresis/paralysis of pelvic limb
2	<i>Hua-tuo-jia-ji</i>	IVDD, relieve back pain
3	LIV-3	<i>Yuan</i> point, remove <i>Qi</i> stagnation and pain, paralysis of pelvic limbs
4	LIV-8	Genital pruritis, urinary incontinence
5	BL-11	Influential point for bone, IVDD, relieve back pain
6	BL-17	Back <i>shu</i> point for diaphragm, influential point for blood, blood/ <i>Yin</i> deficiency
7	BL-18	Back <i>shu</i> point for liver, hepatic disease, relieve back pain
8	BL-20	Back <i>shu</i> point for spleen, support blood regulation, relieve back pain
9	BL-23	Back <i>shu</i> point for kidney, support bone recovery, KID <i>Yin /Qi</i> deficiency, urinary incontinence
10	BL-24	<i>Qi</i> deficiency, relieve abdominal and back pain
11	BL-25	Back <i>shu</i> point for large intestine, support bowel movement, relieve back pain
12	BL-26	Source <i>Qi</i> associate, urinary incontinence, relieve back pain
13	BL-28	Back <i>shu</i> point for bladder, urinary incontinence, relieve lumbo-sacral pain
14	BL-36	Relieve back pain, paralysis of pelvic limb
15	BL-39	Urinary dribbling, relieve back pain and muscle spasms of pelvic limbs
16	BL-40	Master point for caudal back/hip, hip and back problem, relieve lumbar pain
17	BL-54	Master point for pelvic limbs, paresis/paralysis of pelvic limbs, hip problem, perianal problem, relieve lumbar pain
18	BL-60	Relieve back pain, cervical stiffness
19	ST-25	Constipation, diarrhea, relieve abdominal pain
20	ST-35a	Pelvic limb weakness
21	ST-35b	Pelvic limb weakness
22	ST-36	Master point for GI tract and abdomen, Improve <i>Wei-Qi</i> (general tonic)
23	ST-41	Paresis/paralysis of pelvic limbs
24	SP-3	Constipation, diarrhea, relieve abdominal pain
25	SP-4	<i>Luo</i> connecting point to stomach, confluent point to <i>Chong</i> channel
26	SP-6	Master point for caudal abdomen and urogenital system, <i>Yin</i> /blood deficiency
27	SP-9	<i>Yin</i> deficiency, skin itching
28	SP-10	Blood deficiency, blood stagnation, skin itching, paresis or paralysis of pelvic limbs
29	GB-29	Hip joint problem, paralysis of pelvic limb
30	GB-30	Hip joint problem, paralysis of pelvic limb
31	GB-31	Skin itching, paralysis of pevic limb, rear foot problem
32	GB-34	Influential point for tendon ligament
33	GB-39	Influential point for marrow/CNS, cervical stiffness, paresis/paralysis of pelvic limbs, anal problem
34	LI-10	Immune regulation, general tonic, skin itching , thoracic and pelvic limb weakness

35	LU-9	Influent point for blood vessels
36	HT-8	Urinary incontinence, genital itching, pain in the feet
37	GV-20	Calming point, headache
38	CV-6	KID <i>Qi</i> / <i>Yang</i> ronic, loss of body weight, diarrhea
39	KID-3	Kidney source point, relieve back pain, dysuria
40	<i>Wei-jian</i>	Tail paralysis, pelvic limb weakness

**Abbreviations**

LIV	Liver
BL	Bladder
ST	Stomach
SP	Spleen
GB	Gall bladder
LI	Large Intestine
LU	Lung
HT	Heart
GV	Governing vessel
CV	Conception vessel
KID	Kidney

Tabel S2.2 listed the herbal chosen and used in this case. We only used two herbals, the *Fu Fang Ejiao Jiang* and *Gui Pi Tang*. Both herbals works to increasing the blood performance and also supporting the liver and spleen functions.

Table S2.2. List of herbal and its function

No	Herbal	Clinical Indication (s) or Function (s)
1	<i>Fu Fang Ejiao Jiang</i>	Thrombocytopenia, blood deficiency
2	<i>Gui Pi Tang</i>	Thrombocytopenia, blood/ <i>Qi</i> deficiency, support spleen function