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JIVT: an introduction

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Abstract

A two year-old German shepherd presented for anorexia of 18 months duration. Despite extensive diagnostics, a Western diagnosis was never made. Xiao Chai Hu Tang was used to successfully restore a normal appetite.

Signalment and diagnosis

Laska is a spayed, female German shepherd born in February, 2008. She presented initially on 12 November 2010 with a decreased appetite. Laska’s owner had purchased her from a breeder at nine weeks and fed her a high-quality kibbled diet. She had eaten well until seven months when the owner noticed a decrease in appetite and that Laska was chewing her feet. She stopped eating her kibbled diet but would eat treats, plus cooked meat intermittently with coaxing. Laska was currently being fed a new, grain-free kibbled diet as well as canned food twice daily.

Based on symptoms, Laska’s western veterinarian had diagnosed the foot chewing as allergies and prescribed Loratadine. The workup included a physical exam, CBC and blood profile that revealed no abnormalities and no diagnosis was made regarding decreased appetite.

Laska was spayed at three months because a large umbilical hernia required repair. A prophylactic gastropexy and repair of a vesicourachal diverticulum were performed at that time. She was up to date on vaccinations. Medications and supplements included Tri-Heart Plus, Frontline Plus, Loratadine and a glucosamine supplement.

During our exam, Laska was happy and interactive. She weighed 72lb (~33kg) and body condition score was 2/5. Physical examination was normal with no discomfort on abdominal palpation. The owner described her stools as normal, although occasionally soft when they travelled. Laska’s tongue was deep purple and wet and her pulse was taut, slow and irregular. While a western diagnosis had not been determined, the early spay with gastropexy may have had some functional or anatomical effect on digestion and appetite. Differential diagnoses included metabolic disease and neoplasia.

Traditional Chinese Medicine (TCM) diagnosis was Spleen Qi Deficiency, based on decreased appetite, occasional loose stools and vomiting. There was evidence of Qi Stasis in the Middle Jiao from the purple tongue and taut, irregular pulse. The owner requested that acupuncture not be performed at the first visit. San Ren Tang (SRT) was dispensed (Kan Essentials, Three Seeds Combination) at three tablets bid plus VetriMega Probiotic at two capsules three times/week. A homemade meat and vegetable based diet was recommended. SRT was chosen as it provides Spleen Support while addressing Middle Burner Stasis.

At recheck on 23 November, the owner reported Laska was on the homemade diet and her appetite had not improved. She had had one soft stool, but otherwise they were normal. Her tongue was still purple and wet. Her pulse was taut, rapid and slightly slippery on the right. Acupuncture was performed (see Table 1). Active points included BL20, BL22 and ST36. TCM diagnosis was Spleen Qi Deficiency with Dampness, based on decreased appetite, loose stool, active BL20 and ST36, wet tongue and slippery pulse. There was still Qi Stasis in the Middle Jiao evidenced by the purple tongue, taut pulse and active BL22.
Three Seeds Combination) at three tablets bid plus VetriMega Probiotic at two capsules three times/week. A homemade meat and vegetable based diet was recommended. SRT was chosen as it provides Spleen Support while addressing Middle Burner Stasis.

At a recheck two weeks later, the owner reported Laska had eaten well for a few days following acupuncture but her appetite had decreased again, particularly in the morning. She had maintained her weight and was currently eating grain-free kibble supplemented with various cooked meats. Her tongue was purple and wet and her pulse irregular. Acupuncture was done (see Table 1). Active points included BL20, ST36, SP9 and LIV3. TCM diagnosis remained Spleen Qi Deficiency and Triple Burner Stasis. The LJZT was continued and Xiao Chai Hu Tang (XCHT, Minor Bupleurum, Kan Herbs) added at one tablet bid. XCHT better addresses Triple Burner Stasis than LJZT. The latter herb was continued to tonify the Spleen.

During the following 10 months, Laska was seen in this practice and treated with acupuncture every four to six weeks. A variety of different herbal formulas were dispensed. Response to herbal treatment remained minimal to absent. In addition, her western veterinarian did further lab work and instituted additional drug therapy. Treatments are summarised in Tables 1 and 2.

Finally, Laska was seen on 1 November 2011 and weighed 70.5lb (~32kg). The owner had instituted several changes in an attempt to improve her appetite. She had recently adopted a Boxer puppy and hoped that might stimulate Laska’s appetite. She had taken her off of all medication, herbs and supplements, but had re-introduced them because Laska’s appetite worsened. Her tongue remained purple and wet and her pulse irregular and taut. XCHT (Natural Path Herb Company) was prescribed at a dose of 1.5 teaspoons bid.

**Results**

Within a week of beginning XCHT, Laska’s appetite improved to normal. At recheck six weeks later the owner reported her appetite remained good and her weight was 77.8lb (~35kg). Her pulse had normal rate, strength and regularity but her tongue was still purple and wet. At May 2012, Laska remains on the same dose of XCHT. She maintains her weight and her appetite and pulse are normal. Her tongue, however, remains purple and wet.

**Formula**

XCHT (Minor Bupleurum Formula) is classified as a Shao Yang Harmonizing Formula (Chen 2009). Described as ‘one of the most important formulas in the history of herbal medicine’ (Marsden 2006), the formula expels pathogens in the Shao Yang, addresses autoimmune conditions and restores Qi movement along the Triple Burner as well as from the body core to the limbs (Marsden 2006). Pharmacologically, the formula is hepatoprotective, anti-inflammatory, antiulcer and an immunostimulant. Minor Bupleurum’s clinical applications include treatment of pancreatitis, nephritis, chronic renal insufficiency, cough, reflux esophagitis, gastritis, gastric pain, hepatitis and neoplasia (Chen 2007).

The individual herbs comprising the formula are Chai Hu, Huang Qin, Ban Xia, Sheng Jiang, Ren Shen, Zhi Gan Cao and Da Zao. The principal herb, Chai Hu, moves stagnant Qi. Ban Xia, Sheng Jiang, Ren Shen, and Da Zao tonify the Stomach Qi and nourish body fluids (Chen 2009).

A Japanese study demonstrated that XCHT (Shosaiko-to) “possesses the capability of protecting the rat gastric mucosa as well as sucralfate, but also is able to inhibit gastric acid secretion like cimetidine or atropine” (Matsuta 1996). A later study corroborated the formula’s anti-ulcer effects based on its ability to suppress gastric secretions and protect gastric mucosa (Kase 1997). Research has shown XCHT exhibits an anti-inflammatory effect. One study suggests that at least part of this anti-inflammatory effect may be due to the immunomodulatory effects of Bupleurum polysaccharides on macrophages (Cheng 2010). Another Japanese study found the anti-inflammatory effects of the formula may be caused by increased production of nitric oxide, which in turn acts to regulate adhesive interactions between leukocytes, platelets and endothelial cells (Horie 2001).
Discussion

There are several factors of particular interest. Firstly, a patient presenting with overt signs of Spleen Qi Deficiency did not respond to any of the formulas that provide Spleen support. As long as there was Stasis in the Triple Burner, any attempt to support the Spleen was not going to be fruitful.

Secondly, presenting symptoms were minor but the underlying pathology was profound. Laska was playful, basically maintained weight and ate in the evening but not in the morning. However, the owner’s instincts regarding the sluggish morning appetite were sound. Laska’s purple tongue and tight pulse were not normal and suggested a potentially serious underlying imbalance if left untreated. This is where TCM can excel. An underlying pathology can be successfully treated before it progresses to more serious symptomatology.

Finally, it was interesting that Laska did not respond to the Kan formula XCHT earlier in treatment but responded to the Natural Path formula. While speculative, several reasons for the varied responses between the two formulas are possible. First, Laska’s pattern may have changed between the first trial of XCHT and the second. This is unlikely as tongue, pulse and symptoms remained consistent throughout treatment. Second, there may be a difference in absorption and bioavailability between tablets and a loose, granular preparation. Dr Marsden suggests the difference may be due to an increased amount of Ginseng and less Chai Hu in the Natural Path formula (pers comm, May 2012).

Table 1. Most frequent acupuncture points treated between 23 November 2010 and 1 November 2011

<table>
<thead>
<tr>
<th>Acupuncture point</th>
<th>Treatment principle (Wynn and Marsden 2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL18</td>
<td>Liver Qi Stagnation (Active point)</td>
</tr>
<tr>
<td>BL20</td>
<td>Spleen Association Point, Drains Damp, Tonifies Qi and Blood (Active point)</td>
</tr>
<tr>
<td>BL22</td>
<td>Drains Damp, Opens up communication between the Three Burners (Active point)</td>
</tr>
<tr>
<td>BL25</td>
<td>Clears Damp Heat (Active point)</td>
</tr>
<tr>
<td>ST36</td>
<td>Master point for GI function, GI Tonification point, Builds Qi and Blood (Active point)</td>
</tr>
<tr>
<td>SP9</td>
<td>Dispels Damp Heat (Active point)</td>
</tr>
<tr>
<td>SP6</td>
<td>Disperses Damp, Clears Damp Heat, Tonifies Qi, Blood, and Yin</td>
</tr>
<tr>
<td>LIV3</td>
<td>Liver Stagnation, treats GI problems, Qi mover (Active point)</td>
</tr>
</tbody>
</table>
Table 2. History of herbal treatments and results

<table>
<thead>
<tr>
<th>Date</th>
<th>Herbal formula</th>
<th>Treatment goal</th>
<th>Other treatments and diagnostics</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/12/10</td>
<td>San Ren Tang (Kan Essentials)</td>
<td>Drain Damp, Support Spleen, Open Triple Burner</td>
<td>Probiotic (VetriScience)</td>
<td>No change</td>
</tr>
<tr>
<td>11/23/10</td>
<td>Liu Jun Zi Tang (Kan Essentials)</td>
<td>Tonify Spleen</td>
<td>Homemade cooked meat-based diet</td>
<td>Improvement first few days post acupuncture then decreased appetite</td>
</tr>
<tr>
<td>12/6/10</td>
<td>Liu Jun Zi Tang (Kan Essentials) Liu Jun Zi Tang (Kan Herbal) Xiao Chai Hu Tang (Kan Herbal)</td>
<td>Tonify Spleen Open Triple Burner</td>
<td></td>
<td>Improvement for 10 days then decreased appetite</td>
</tr>
<tr>
<td>12/28/10</td>
<td>Continue LJZT and XCHT pending</td>
<td>Consultation with Dr Marsden</td>
<td></td>
<td>Decreased appetite</td>
</tr>
<tr>
<td>1/18/11</td>
<td>Xiao Yao San</td>
<td>Support Spleen by Subduing Liver Overriding Spleen</td>
<td>Decreased activities, especially training and therapy dog to decrease stress</td>
<td>Improved appetite, although not considered normal</td>
</tr>
<tr>
<td>2/8/11</td>
<td>Xiao Yao San</td>
<td>Continue treatment that has demonstrated efficacy</td>
<td>¼-1/2 teaspoon grated ginger added to food</td>
<td>Return to poor appetite. Stretches as if in pain</td>
</tr>
<tr>
<td>3/1/11</td>
<td>Xiao Yao San</td>
<td>Worked in the past, will continue pending further consultation with Dr Marsden</td>
<td>Abdominal xrays show large amounts of gas in the large intestine</td>
<td>No improvement</td>
</tr>
<tr>
<td>3/29/11</td>
<td>Wei Ling Tang</td>
<td>Drain Damp, Support Spleen</td>
<td></td>
<td>No improvement</td>
</tr>
<tr>
<td>6/17/11</td>
<td>Si Miao San</td>
<td>Drain Damp Heat, Support Spleen</td>
<td></td>
<td>No improvement</td>
</tr>
<tr>
<td>8/30/11</td>
<td>San Ren Tang</td>
<td>Drain Damp, Support Spleen, Open Triple Burner</td>
<td></td>
<td>No improvement</td>
</tr>
<tr>
<td>9/20/11</td>
<td>Ge Xia Zhu Yu Tang</td>
<td>Dispel Blood Stagnation below diaphragm</td>
<td></td>
<td>No improvement</td>
</tr>
<tr>
<td>11/1/11</td>
<td>Xiao Chai Hu Tang (Natural Path)</td>
<td>Open Triple Burner</td>
<td>Free T4 (normal) TLI (normal) Cobalamin (normal)</td>
<td>Improvement to normal appetite</td>
</tr>
</tbody>
</table>
### Table 3. Symptoms and TCM diagnosis

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>TCM DIFFERENTIAL DIAGNOSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Umbilical hernia, vesicourachal diverticulum</td>
<td>Kidney Jing Deficiency</td>
</tr>
<tr>
<td>Anorexia, especially in the morning</td>
<td>Spleen Qi Deficiency</td>
</tr>
<tr>
<td>Chewing on feet</td>
<td>Liver Wind</td>
</tr>
<tr>
<td>Occasional soft stool</td>
<td>Spleen Qi Deficiency, Damp</td>
</tr>
<tr>
<td>Purple, wet tongue</td>
<td>Stasis, Damp</td>
</tr>
<tr>
<td>Active BL18</td>
<td>Liver Qi Stagniation</td>
</tr>
<tr>
<td>Active BL20</td>
<td>Dampness, Qi and Blood Deficiency</td>
</tr>
<tr>
<td>Active BL22</td>
<td>Dampness, Triple Burner Stasis</td>
</tr>
<tr>
<td>Active BL25</td>
<td>Damp Heat</td>
</tr>
<tr>
<td>Active ST36</td>
<td>Digestive weakness, Qi and Blood Deficiency</td>
</tr>
<tr>
<td>Active SP9</td>
<td>Damp Heat</td>
</tr>
<tr>
<td>Active LIV3</td>
<td>Liver and Qi Stagnation</td>
</tr>
<tr>
<td>Gas in intestines on x-rays</td>
<td>Qi Stagnation</td>
</tr>
<tr>
<td>Stresses when leaves the house</td>
<td>Liver Qi Stagniation</td>
</tr>
<tr>
<td>Stretches when eating</td>
<td>Liver Qi Stagniation</td>
</tr>
<tr>
<td>Does not like heat</td>
<td>Excess or Empty Heat</td>
</tr>
<tr>
<td>Response to XCHT</td>
<td>Triple Burner Stasis</td>
</tr>
</tbody>
</table>

### References


Herbal Therapy in a Dog with Recurrent Mast Cell Tumors

Leilani Alvarez DVM

Abstract

Herbal therapy with Jia Wei Xue Fu Zhu Yu Tang provided effective palliative treatment in a dog with recurrent mast cell tumors. The case history and initial conventional approach are presented. The pet survived four months after incomplete surgical excision of an aggressive grade 3 mast cell tumor with local lymph node metastasis. The herbal formula Jia Wei Xue Fu Zhu Yu Tang is discussed in detail. The use of herbal therapy, plus dietary changes, provided alternative options for treatment when conventional approaches had failed.

Introduction

Mast cell tumors (MCT) comprise 7-21% of all skin tumors reported in dogs (Hahn et al 2004). The incidence of multiple cutaneous MCTs in veterinary medicine ranges from 9% to 29% (Tams 1981, Mullins et al 2006). Multiple prognostic indicators have been identified, including tumor location, histologic grade, duration of disease, mitotic index and other DNA markers (Hahn et al 2004, Schultheiss 2011, Mullins et al 2006). Higher histologic grade is associated with shorter survival times and higher incidence of metastasis (Schultheiss et al 2011). Tumors located on the trunk are associated with the shortest survival time (Hahn et al 2004).

Local recurrence is associated with decreased survivability (Seguin et al 2006). The prognosis after radiation treatment for grade-III MCTs, with or without regional lymph node metastasis, is generally poor compared with that of dogs with grade-I or grade-II tumors (Turrel et al 1988, Ogilvie and Moore 1995, Schultheiss et al 2011). Results of another study (Seguin et al 2001) indicate there was no difference in prognosis for dogs with multiple cutaneous MCTs compared with dogs with solitary cutaneous MCTs.

In the present case, the patient had recurrent cutaneous MCTs over a period of three years and a grade 3 MCT that was incompletely excised with local lymph node metastasis. Given poor response to previous conventional approaches, the owner was seeking alternative therapies to help her pet. The high histologic grade of the pet’s tumor, location along the truck, long duration of disease and evidence of metastasis yielded a poor prognosis for this patient.

A combination of herbal therapies with modified Xue Fu Zhu Yu Tang and dietary adjustments provided an opportunity to increase the patient’s quality of life.

Case presentation

An eleven year old male intact Dachshund, 16lb 12oz (~7+kg) presented with the major complaint of recurrent cutaneous MCTs for the past three years. Most recently, he had been diagnosed with a grade 3 MCT on the left axillary trunk that was incompletely excised and had local lymph node metastasis. The pet was previously healthy until four years prior when he was attacked by dogs and, since then, began to develop multiple MCTs. He had had a hemilaminectomy for disc rupture two years prior to presentation.

The first MCT was diagnosed as a grade 3 on the left thorax one year following the dog attack. The tumor was surgically excised with clean margins and no recurrence was noted. The following year, a second MCT grade 1 was diagnosed in the right cervical region that was completely excised. One year later, another grade 1 MCT in the right scapular region was completely excised. Three months later, a grade 3 poorly differentiated MCT, greater than 3cm diameter, was diagnosed on the left axilla with local lymph node metastasis.
Surgical excision was incomplete. Presentation was one month after surgery.

Conventional evaluation

On initial exam, the pet was bright, alert and responsive with normal vital signs. His physical exam was within normal limits except for a dry hair coat, multiple scars in the dorsal cranial thorax and a healed incision in the left axillary region. Laboratory findings, including a complete blood count and biochemical profile, were within normal limits except for mildly elevated liver enzymes: alkaline phosphatase 338 (range: 5-131), GGT 17 (range: 1-12). His abdominal and three thoracic radiographs were unremarkable.

The pet’s current medications included Famotidine 5mg daily and Diphenhydramine 12.5mg daily. His diet consisted of home-cooked varied proteins (turkey, lamb, chicken, beef, egg or liver) plus a small portion of dry Wysong and Solid Gold commercial dry dog food. There were no fresh vegetables included in his diet.

Traditional Chinese Veterinary Medicine (TCVM) evaluation

On physical exam, the dog had cool ear tips and paws, thin skin and a flaky hair coat. These are signs of Liver Blood Deficiency. He had multiple thick scars along his dorsum and lack of hair growth, signs of Blood Stasis. He was slightly overweight with body condition score 6/9. The owner reported he was calm, easy going, patient, was never irritable and always had a great appetite. These traits are consistent with a TCVM Constitution of Earth.

He had active dreams during sleep and was warm seeking. His tongue was purple (indicating Stasis) and dry (indicating Blood or Yin Deficiency). His pulse was thin (indicating Blood Deficiency) and deep. Active acupuncture points were found at BL18 and BL20 and may be related to Blood Deficiency. The TCVM assessment was Liver Blood Deficiency leading to Blood Stasis.

Initially, his treatment plan included removal of the commercial dog foods and adding fresh vegetables to his home-cooked diet in order to boost antioxidants and fibre. We added Blood and Yin tonifying foods such as liver, eggs, broccoli and spinach. An herbal formula, Jia Wei Xue Fu Zhu Yu Tang (JWXFZYT) was prescribed at ½ tablet bid.

On recheck exam one month after starting JWXFZYT, he was doing very well with a great appetite and energy level. His tongue was lavender with more moisture than previously and his pulse was still deep, but fuller. On the following check two months after initial presentation, he had started to limp on his left front limb and there was a palpable mass in the left axillary region. We increased the JWXFZYT dose to ½ tablet bid and started a homeopathic pain reliever, Traumeel at ½ tablet tid.
One week later, the mass had grown in size and he was not as playful as usual. The pet's tongue was purple and his pulse was weak. We added additional herbs, including Stasis Breaker at 1 cap bid (Fritillaria, Ostrea, Sparaganium, Zedoary, Scutellaria, Oldenlandia) to further break Blood Stasis, plus Wei Qi Booster at 1 cap bid (Astragalus, Angelica, Condonopsis, Lindera, Citrus, Scutellaria, Oldenlandia, Scrophalaria) to tonify Qi, boost Wei Qi and inhibit tumor growth. Two weeks later, the patient was less mobile and was drinking excessive water. He was eating but not enthusiastically. He had tachycardia and a new heart murmur was auscultated. His tongue was pale purple and his pulse was weak and floating. The Wei Qi booster was increased to 2 caps bid.

A few days later, his appetite was very poor, he started to vomit and his breathing was labored at times. At that point, all herbal medications were stopped and we continued only Famotidine and Diphenhydramine. One week later, three months after initial presentation and four months after the tumor removal, the patient was experiencing collapse episodes and was very lethargic. His breathing was continuously labored and he had a very poor appetite. His tongue was pale and his pulses were empty and weak at all levels. He was euthanased at that time.

Discussion

This patient showed evidence of Liver Blood Deficiency in the dry hair coat, frequent dreaming, thin pulse and mildly elevated liver enzymes. Repeated surgeries and scarring further blocked flow of Qi and Blood, eventually lead to Blood Stasis as evidenced by the disk rupture, purple tongue, scarring, recurrent masses and cool extremities.

JWXFZYT adds Blood moving herbs (Sparaganium and Curcuma) to the traditional Blood's Place formula in Xue Fu Zhu Yu Tang (XFZYT). The formula tonifies Liver Blood, moves stagnant Liver Qi and eliminates Blood Stasis. It stimulates the immune system, kills neoplastic cells and enhances effects of conventional therapies (Marsden 2008). The sub-formula Si Ni San (Bupleurum, Peony, Citrus, Bitter Orange and Licorice) has Qi and Blood moving effects.
Peony supports Liver Blood, eliminates pain and moves Blood, Bupleurum is Qi moving, Bitter Orange moves Qi internally and Licorice is harmonising. Rehmannia, Chinese Angelica, Carthamus and Persica tonify Blood. Ligasticum moves Blood. Platycodon moves Qi to the Upper Burner and Cyathula root removes Stasis and moves Blood downward. Red Peony and Rehmannia cool Blood of Stasis Heat (Marsden 2008). In this way, JWXFZYT treated not just external symptoms, but addressed the root cause of the patient’s cancer, which was Liver Blood Deficiency that led to Blood Stasis.

Recent research has shown promise in the efficacy of Chinese herbal medicine in the treatment of cancer. Chinese herbal formulas have shown powerful anticancer effects, including inhibition of angiogenesis, induction of apoptosis, enhancing immunity and reversal of multidrug resistance (Ruan et al 2006). Integrating complementary and alternative therapies with conventional approaches improves the outcome of cancer treatments and reduces side effects (Beinfield and Korngold 2003). In fact, studies have shown that herbal medicines act synergistically via biomodulation with chemotherapy drugs (Sagar and Wong 2008).

Use of XFZYT is supported in the human literature. A review of its pharmacology and clinical applications reported a wide range of uses in human medicine, including coronary heart disease, hypertension, chronic hepatitis and liver cancer, subcutaneous hematomas and urticaria, among others (Jingxi and Guodong 1993). Its mechanism of action includes improved capillary microcirculation, increased tissue perfusion, decreased platelet aggregation and enhanced immune activity. A study on rats demonstrated that XFZYT had a protective effect on ischemic myocardial reperfusion injury (Tang et al 2010).

Diets low in simple carbohydrates and higher in fat with moderate protein levels have shown improved survivability in dogs with cancer (Olgivie 2006). Eliminating commercial food (high in carbohydrates), adding fresh vegetables and Yin and Blood tonifying foods, likely contributed to the patient’s wellbeing.

Dogs with MCTs >3cm were shown to have a shorter survival time as compared to dogs with tumors ≤3cm maximum diameter before surgery (Hahn et al 2004). Results of this study showed grade-III MCTs are biologically aggressive tumors with high local-regional metastatic rates. The dogs with tumors >3cm survived an average of 24 months. These dogs had surgery plus radiation treatment, whereas the patient in this case report did not receive radiation. In the Hahn study, 17 dogs died due to aggressive MCT disease and were not included in the statistical analysis (Hahn et al 2004).

In another study, it was demonstrated that having multiple MCTs was not associated with a worse prognosis, but rather the individual grade of the MCT was more likely to determine survival (Mullins et al 2006). There is no clear data indicating survival time for incompletely excised grade 3 MCTs with metastasis. In a retrospective study of 100 dogs evaluating MCTs that were removed surgically with no additional treatment, only four dogs had grade 3 tumors with metastasis at time of surgery. Survival of these four dogs ranged from three to nine months, however, none had a tumor located on the trunk, as in this case report (Shultheiss et al 2011). Excellent survivability (>24 months) was reported for dogs with completely excised grade 2 MCTs and no additional treatment (Seguin et al 2001). However, in this study the three dogs with evidence of metastasis at the time of surgery had an average survival time of 151 days (range two to six months) and these were completely excised grade 2 tumors, unlike the current case with a grade 3 MCT.

Dogs with MCTs >3cm were shown to have a shorter survival time as compared to dogs with
Summary and conclusions

The use of JWXFZYT was an effective palliative treatment and afforded four months' survival to our patient despite an incompletely excised aggressive grade 3 MCT, with a prognostically poor location and presence of metastasis. As other herbal formulas and dietary changes were part of the treatment plan, we cannot conclude his survival was due solely to the use of JWXFZYT. For a more accurate assessment of the effects of JWXFZYT on this patient, we could have used the formula without other therapies. However, as has been shown previously, integrated approaches are often more successful than individual therapies due to synergistic effects and complex mechanisms of disease (Sagar and Wong 2008, Beinfield and Korngold 2003). Therefore, it did not seem ethical to withhold potentially beneficial treatments from the patient in exchange for scientific accuracy.

In future cases, where Blood Deficiency and Blood Stasis is the underlying cause of recurrent cutaneous MCTs, it would be advisable to introduce the herbal formula XFZYT immediately rather than waiting until end-stage disease.

A larger-scale study using JWXFZYT would offer more substantial evidence for the use of this herb in the treatment of recurrent cutaneous MCTs. The study could compare a control group receiving conventional treatments (surgery, radiation, chemotherapy) to a study group receiving integrated therapies (conventional plus JWXFZYT).

References


Use of Du Huo Ji Sheng Tang to treat Bi Syndrome

Elaine Murphy

Abstract

A 14 year old, female Jack Russell terrier was diagnosed with Bi Syndrome and successfully treated with Du Huo Ji Sheng.

Introduction

Jem is a female spayed, 14 year old Jack Russell terrier. She had a history of lameness that was unresponsive to Meloxicam and was successfully treated with Chinese herbal medicine.

History

Jem has had numerous bouts of otitis and cytology revealed yeast and bacteria. She was treated with various ear medications over the years, mostly combination anti-inflammatory, antifungal, antibacterial medication such as Surolan (Merial). She had bilateral lenticular sclerosis and several adenomas and grade 3 tartar with halitosis. Jem was aggressive to the other dog in the house and had to be separated at meal times.

She had anal gland sacculitis and, in 2007, an anal gland abscess. The owner noted she was slowing down and could no longer go running with her. The range of motion in Jem’s hips was reduced and she felt pain on manipulation. No lesions were seen on radiographs and Meloxicam was prescribed. In 2008, she had muscle atrophy on the hind end, was painful at the thoraco-lumbar (T-L) area and could not extend her hips. She was markedly worse in cold weather. Radiographs showed spondylosis at the T-L junction and degenerative joint disease (DJD) in the coxo-femoral and stifle joints. Meloxicam was continued and a glucosamine supplement was prescribed. In December 2008 she was referred for acupuncture and chiropractic treatment.

Assessment

Physical findings were soreness at the T-L area; poor range of movement in the hind legs; poor flexion and pain in the stifles; incontinence; bilateral lenticular sclerosis; adenomas and lipomas.

Blood analysis showed mildly elevated BUN 11.4 (N=2.14–8.9) and amylase 1193 (N=290–1125). All other values, including thyroid levels, were within normal parameters. Traditional Chinese Medicine (TCM) findings included not being alert in the morning and wanting to return to bed and she had noisy dreams each night. Jem always seemed to be cold and sought a warm place to rest, her lameness was worse in the morning, after a period of rest, or in cold weather. She was incontinent at night.

Western diagnosis

A western diagnosis was DJD and spondylosis. Treatment options were pain and anti-inflammatory medication, however these were not providing adequate relief of her symptoms. The lenticular sclerosis was part of the aging process seen in many dogs and no treatment options exist. The adenomas and lipomas were benign. Surgery to remove the growths, if they were causing issues, would be an option. The aggression and possessiveness was considered her personality and could be treated with medication such as Clomipramine. The recent withdrawal from family life may have been a manifestation of pain, aging or behavioural issues. The incontinence was a hormone deficiency and could have been treated with diethylstilbestrol or phenylpropanolamine to tone the urinary sphincter. Jem was starting to show mild kidney disease with elevated BUN and amylase.
Eastern Diagnosis and Herbal Treatment

The Chinese diagnosis was Cold Bi Syndrome caused by Kidney Yang or Qi Deficiency. Kidney Deficiency is the most common diagnosis in animals with hind end weakness and low back pain. General symptoms of Kidney Yang/Qi Deficiency are mild to moderate azotemia, incontinence, fatigue, chilly, worse in cold weather, DJD, spondylosis, hind-end pain and weakness (Fougere 2010:24).

TCM is often explained using metaphors. A very useful metaphor is the analogy of a cooking pot suspended over a fire (Marsden and Wynn 2003:3). The body is divided into three sections or Burners. The fire is called the Lower Burner, the pot is the Middle Burner and the lid is the Upper Burner. The fire under the pot is the Kidney. The Spleen and Stomach are the pot over the fire and rely on the fire below being adequate to steam vapours, or Qi, up to the lid of the pot, the Lungs. Picture soup in a pot – if it is steaming there is vapour on the lid. If the fire under the pot is inadequate, there is a film on the soup. These are considered disease causing pathological fluids known as Damp and Phlegm respectively.

The Heart is housed in the Upper Burner. It tends to overheat if not cooled by the Kidney. The Liver and Gall Bladder regulate the movement of Qi and Blood. If Blood is deficient the Liver cannot supply the tissues. When the Kidney is deficient (the fire is low), the Spleen cannot generate Qi properly. Damp and Phlegm are generated instead causing an obstruction of Qi and Blood to the limbs, resulting in pain. This is called Bi Syndrome. The stagnation of the Qi and Blood causes friction and the passive release of Heat is called Damp Heat.

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The clinical signs exhibited by Jem correlate with the TCM disease model of Bi Syndrome caused by Kidney Deficiency. The Kidney fire was weak, the Kidney Yin was not steamed up to the Upper Burner to help cool and descend Heart Yang. This caused irritability with the other dog. The Kidney was not warmed, resulting in the Spleen generating Damp that obstructed the channels, causing weakness in the hind end, symptoms worsening in cold weather, stasis, pain and incontinence. Jem showed numerous signs of Damp and Damp Heat in her history – sluggishness in the morning, anal gland sacculitis and abscess, lenticular sclerosis, adenomas, lipomas and otitis. The coughing was due to Lung Qi not descending properly. The Blood supply to the Liver was reduced due to the Damp and there was Stasis in the channels (causing acupuncture point GB34 to be active), pain, DJD, spondylosis and excessive dreaming. Stagnation of Qi and Blood leads to further malnourishment of the Liver and Kidney. Qi, Blood, Liver and Kidney all become more deficient (Chen and Chen 2009:1161). The mild elevation of BUN and amylase support Kidney Qi or Yang Deficiency. The small, red tongue is Qi or Yin Deficiency and Heat. The deep, wiry pulse is a Deficient, Stagnant pulse.
Du Huo Ji Sheng Tang (DHJST) in the granular formula was prescribed, at 1/4 teaspoon bid mixed in canned food. This formula tonifies Qi, Blood, Yin and Yang, expels Wind, Cold and Damp, thereby relieving pain. DHJST consists of Si Wu Tang and three of the four herbs in Si Jung Zi Tang, with the addition of Eucommia (Du Zhong), Loranthus (Sang Ji Shen), Achyranthes (replaced by Cyathula (Chuan Niu Xi) in modern formulas), Asarum (replaced by Curculigo (Xian Mao) in modern formulas), Pubescent Angelica (Du Huo), Large Leaf Gentian (Qin Jiao) and Ledebouriella (Fang Feng).

- Si Wu Tang (Peony (Bai Shao), Rehmannia (Di Huang), Chinese Angelica (Dang Gui) and Ligusticum (Chuan Xiong)) is a Blood tonic. Si Jung Zi Tang (Ginseng (Ren Shen), Liquorice (Gan Cao) and Poria (Fu Ling)) is a Qi tonic
- Eucommia (Du Zhong) tonifies Kidney Yang
- Loranthus (Sang Ji Sheng) expels Wind, Cold, Damp and strengthens the Kidneys
- Cyathula (Chuan Niu Xi) tonifies Kidney Yin and has added Blood moving and pain relieving effects while nourishing the lower back
- The three herbs above have pain relieving effects and strengthen the lower back
- Curculigo (Xian Mao) dispels Wind, Cold, Damp and strengthens the Kidney and bones.
- Angelica Pubescens (Du Huo), Large Leaf Gentian (Qin Jiao) and Ledebouriella (Fang Feng) expel Wind, Cold, Damp from the channels, allowing Blood and Qi to course to the periphery of the body, relieving any stasis.

Research is ongoing into how Chinese formulas exert their influence. In a study by Chen et al (2011), DHJST was found to exert a significant therapeutic effect on osteoarthritis in rabbits. The mechanism was associated with inhibition of VEGF and HIF-1α expression. In a study by Guo et al (2004), Si Wu Tang was shown to regulate the protein expression of bone marrow in blood deficient mice, promoting the growth and differentiation of hematopoietic cells.

Individual ingredients in DHJST have been shown to have anti-inflammatory effects. For example, Rehmannia's main active ingredients are iridoid glycosides that stimulate production of adrenal cortical hormones which in turn have an anti-inflammatory effect (Dharmananda 2010). Eucommia's anti-inflammatory potencies are due to its various iridoids. Kim et al (2009) found that Eucommia suppressed the COX-2 enzyme to decrease inflammation.

Tetramethylpyrazine (TMP), a pure compound derived from Ligusticum, was shown to exert a neuroprotective effect against spinal cord ischemia-reperfusion injury by reducing inflammation. TMP treatment reduced the expression of pro-inflammatory cytokines TNF-α and IL-1β, upregulated expression of anti-inflammatory cytokine IL-10 and inhibited activation of NF-κB (Fan et al 2011). Peony's anti-inflammatory effects may be mediated, at least in part, via its gallic acid content and this effect may be regulated in part by an inhibition on cAMP-PDE (Jiang 2011).

Yao et al (2005) showed that when Loranthus, Eucommia and Achyranthes were added to bone cell cultures they influenced the proliferation and differentiation of osteoblasts from their precursor cells. The finding from the organ culture indicated that Chinese herbal mixtures could effectively increase the rate of tissue regeneration of damaged bones.

Discussion

Jem showed improvement within one week of using DHJST. She was more interactive, hiding less, had fewer urinary accidents in bed, was less painful and started going down stairs again. The herb, chiropractic and acupuncture treatments are ongoing and she continues to improve. The dose of Meloxicam has been steadily decreased. She is now able to go for short walks and is pain free.


Biomedical Advances in Acupuncture
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Abstract
This paper reviews select papers from the past three years of published literature of interest to veterinary acupuncturists, highlighting information of practical clinical relevance. The research is discussed in the context of biomedicine to integrate our observations as practitioners with research. This helps to bridge two worldviews – those of science and acupuncture practice.

Introduction: the science of acupuncture
There are a plethora of papers published on acupuncture. As of January 2012, there were 17,373 listed for ‘Acupuncture’ on PubMed. Of these, 307 were listed for ‘Veterinary Acupuncture’. This research, review and commentary, no doubt, has led to a general acceptance of acupuncture having a physiological, if not clinical, effect in humans and animals.

As practitioners trained in biomedicine as well as acupuncture, it is not difficult to justify our daily observations and experiences of individual case outcomes, together with our knowledge of physiological effects, as evidence for the efficacy of acupuncture. This is especially the case when we treat patients with complex conditions and chronic disease. Even in conventional medicine, it is rare to find randomized controlled trials providing evidence for treatment for these types of patients. Despite this, it is useful to be aware of the published literature to help explain acupuncture efficacy, as well as conflicting reports that question efficacy.

This paper reviews issues on: acupuncture research; sham acupuncture; and why research might be confounded by new findings in the understanding of the role of fascia in acupuncture. The paper also reviews recent studies in veterinary acupuncture and some interesting published case studies.

Two Systematic Reviews on Acupuncture and Pain
A review by Ernst, Lee and Choi (2011) critically evaluated systematic reviews of acupuncture as a treatment of pain. The systematic reviews had to be published since 2000 and 57 met the inclusion criteria. Four were of excellent methodological quality. Numerous contradictions and caveats emerged. The authors found positive conclusions from more than one high-quality systematic review existed only for neck pain. 95 cases of severe adverse effects (pneumothorax and infections in the main) were found which included five fatalities. Ernst et al concluded that numerous systematic reviews have generated little truly convincing evidence that acupuncture is effective in reducing pain. They warn that serious adverse events, including deaths, continue to be reported (Ernst et al 2011).

Two of the same authors, Ernst and Lee (2011), evaluated the Cochrane Central Register of Controlled Clinical Trials on acupuncture and pain. They state that Cochrane reviews have the reputation for being more transparent and rigorous than other reviews. The authors evaluated and summarized eight Cochrane reviews that were all of high methodological quality and related to a wide range of pain syndromes. Four reviews concluded that acupuncture is effective for migraines, neck disorders, tension-type headaches and peripheral joint osteoarthritis. One review failed to demonstrate the effectiveness of acupuncture for rheumatoid arthritis. Three reviews were inconclusive for shoulder pain, lateral elbow pain and low back pain. The authors concluded that acupuncture is effective for some, but not all, types of pain. Clearly there is discrepancy even...
in systematic reviews which are a higher order level of evidence than randomized controlled trials.

**Sham Acupuncture**

Perhaps one of the reasons for seeming conflict, by the same authors may lie in the conduct of randomized controlled trials with acupuncture. Linde et al. (2010) raise the question whether sham acupuncture is associated with potent non-specific effects. These might account for the discrepancy between several recent large randomised trials finding clinically relevant effects of acupuncture over no treatment or routine care, whereas blinded trials comparing acupuncture to sham interventions often reported only minor or no differences. The authors reviewed MEDLINE, Embase and the Cochrane Central Register of Controlled Clinical Trials. In addition, reference lists were searched to April 2010 to identify randomised control trials of acupuncture for any condition, including both sham and no acupuncture control groups.

37 trials with a total of 5,754 patients met the inclusion criteria. They found that ‘sham acupuncture interventions are often associated with moderately large nonspecific effects which could make it difficult to detect small additional specific effects. Compared to inert placebo interventions, effects associated with sham acupuncture might be larger, which would have considerable implications for the design and interpretation of clinical trials’ (Linde et al 2010).

**Fascial mechanisms of acupuncture**

Large non-specific effects of sham acupuncture and the specific effects of acupuncture might be accounted for in a relatively new model for understanding the meridians, or channels, of acupuncture. Bai et al. (2011) review evidence that supports the relationship between traditional concepts of meridians, their acupuncture points and the anatomy of the fascia. This arose from new magnetic resonance imaging (MRI) body scan data, produced by the Visible Chinese Human project, a Chinese National Basic Research program. Fascial connective tissue in the human body, trunk and limbs showed line-like structures, supporting the view that the body’s fascial network may be the physical substrate represented by the meridians of Traditional Chinese Medicine (TCM).

From a TCM perspective, the meridians, or jīngluò in Chinese, are in principle like strings of acupoints, or a conduit through which energy flows throughout the body (Xutian et al. 2009). A review of the literature by Ahn et al. (2008) concluded that the available evidence did not conclusively support the claim that acupuncture points had distinct electrical properties. Li et al. (2008) reported evidence suggesting that visualized regional hypodermic migration channels of interstitial fluid constituted the meridians.

Finado and Finado (2011) also posit that the fascia is the mechanism of action of acupuncture therapy. They describe the fascia as a new organ: ‘a continuous sheath of tissue that moves, senses and connects every organ, blood vessel, nerve, lymph vessel, muscle and bone’. Guimberteau (2007) suggests fascia can be considered: ‘a single organ, a unified whole, the environment for all body systems functioning, connected to every aspect of human physiology’. Acupuncture is based on the TCM model of a metasystem that links and influences every aspect of human physiology, the fascia provide an anatomical basis for this metasystem (Finado and Finado 2011).

Bai et al. (2011) support the fascia network hypothesis of meridians, that is, the view the fascia may be the anatomical basis for acupoints and meridians (Wang et al. 2007). They suggest the needle grasp phenomenon, dei qi, indicates that the efficacy of acupuncture relies on interaction of the needle with the fascia. They posit that if the meridians are fascia, then the energy ‘Qi’ may be any, or a combination of, the following processes: nerve signals; flow of paracrine signalling molecules; electrical signalling through gap junctions among perineural cells; and distribution of mechanical forces.

Finado and Finado (2011) state that acupoints are known to be anatomically present as loci that affect certain aspects of the body’s terrain and are similar to trigger points in that they become ‘active’ in response to fascial deformations. They suggest the point/ channel system may
well be viewed as a map of potential sites of fascial activity allowing us to identify, through careful palpation, the areas of fascial/visceral dysfunction and to treat locally and distally along the fascial plane. They point out that the rapid release of myofascial trigger points through needling demonstrates that the simple prodding of the fascia to react can produce a dramatic effect.

Bai et al (2011) also propose that the distribution of fascial connective tissue enables acupoints to exist in every part of the body and suggest the difference between clinically recognised acupoints and nonacupoints, as well as between main acupoints and supplementary acupoints, lies principally in the intensity of biological reactions rather than in the gross structural components per se. Finado and Finado (2011) conclude that fascia-based acupuncture, requiring careful palpation, represents a return to fundamental principles, one in which the terrain rather than the map takes precedence as the focus of acupuncture treatment. This would have implications for clinical acupuncture research in that it may be better served by using a palpation-based approach as the independent variable rather than a standardised treatment from a formulary. This theory could account for why sham acupuncture may appear to work.

Other meridian studies

Longhurst (2010) reviewed a number of methods used to identify and explain meridians anatomically. Thus, tendomuscular structure, primo vessels (Bonghan ducts), regions of increased temperature and low skin resistance have been suggested. However, none of these methods has met the criteria for a meridian – an entity that, when stimulated, can result in clinical improvement. Longhurst proposes the neural hypothesis of acupuncture is the physiological rationale for the clinical influence of acupuncture. Consistent observations are that acupoints and meridians:

- are located over larger mixed-nerve bundles containing motor units and sensory fibres
- project to regions in the central nervous system that regulate pain and blood pressure
- stimulation of the underlying neural pathways can account for the physiological effects and clinical responses to acupuncture in patients.

However, Longhurst (2010) says despite the body of evidence supporting the neural hypothesis, there are a number of unanswered issues that still need to be addressed with respect to the concepts of meridians and acupoints. Such as:

1. Why are only some meridians and acupoints effective for treating certain conditions?
2. What is known about meridians and acupoints not located over major neural pathways? How do they exert their clinical actions? Could they work by stimulating a finer network of nerves, or do they operate outside of the nervous system?
3. Why do some patients, approximately 70%, respond to acupuncture while others do not, even when the appropriate meridian, acupoint and nerve are targeted during stimulation?
4. If stimulation of underlying neural pathways is the physiological mechanism that explains how acupuncture works clinically, is it possible that many more (supplementary) acupoints located along the same meridian and neural pathway could effectively treat the clinical condition?

Perhaps the neural hypothesis combined with the fascial hypothesis can answer these questions. An interesting study by Kim et al (2009) used MRI and acupuncture in small animals (rats and mice). Injecting a contrast agent at acupuncture points BL18, 20 and 23 showed the final distribution of the agent from each point corresponded to the respective organs of the acupoint. The results suggested different migration paths and destinations for pharmacopuncture drugs.

Recent Veterinary Studies

There are several recent studies that can influence veterinary acupuncture and acupuncture research methodology.
Recurrent otitis in dogs: a 1-year follow-up of a randomized controlled trial

Sánchez-Araujo and Puchi (2011) assessed whether the relapse rate of recurrent canine otitis over one year can be modified by acupuncture in adult dogs. The study was a one-year follow-up (in 1998) of a randomized controlled trial conducted in 1997. 31 dogs with a history of recurring otitis were randomized into two groups in a veterinary clinic in Venezuela. Dogs were aged between two and 10 years and the most common breeds were cocker spaniel (42%) and poodle (23%). In addition to conventional treatment, each group received four sessions of either real acupuncture, group A (n=16), or sham acupuncture, group B (n=15). The data was analyzed in 2007. The main outcome for the follow-up was the rate of acute otitis episodes in each group over one year, with blinded evaluation. There was one dropout in each group. Fourteen (93%) dogs in group A were free of otitis relapses, compared with seven (50%) in group B.

For the treatment group, the acupuncture points were chosen using a neurobiological approach, based on the association between a dermatome and its corresponding neural and viscerosomatic segment. The authors chose the periauricular sensory field, C2-C3. The acupoints TH17, TH21, SI19 and GB20 were superficially punctured around the affected ear, together with LI4 on the ipsilateral forelimb. One session of 15 minutes every three days was applied just after auricular cleaning and a conventional treatment session. Each dog in both groups received four sessions of conventional treatment and needling. Five needles were used during each session, inserted up to a depth of 2-3 mm and without mechanical stimulation:

1. TH17 located in the depression between the mandible and the mastoid process
2. TH21 located in the depression facing the supratragal notch
3. SI19 found just in front of the central part of the ear tragus
4. GB20 placed on the posterior and lower part of the mastoid process, behind the insertion of the sternoclidomastoid muscle
5. LI4 located in the angle formed between the dog’s first and second metacarpal bones.

For the control sham acupuncture group, five needles were superficially inserted at random points around the kneecap in the contralateral knee for 15 minutes – therefore into a segmental zone far away from the area of pathology (the ear) and devoid of classical acupuncture points. No needle manipulation was performed. The authors concluded: acupuncture seems effective for preventing relapses in cases of recurrent canine otitis; acupuncture could be tested as a treatment of other recurrent localized infections; and the immune response to acupuncture also seems worth exploring.

Gold Implantation for refractory epilepsy in dogs

Goiz-Marquez et al (2009) evaluated both clinically and with electroencephalographic (EEG) recordings, the effect of gold wire implants in acupuncture points in dogs with uncontrolled idiopathic epileptic seizures. Fifteen dogs diagnosed with the condition were enrolled in the study. After treatment, nine of the 15 dogs (60%) had at least a 50% reduction in seizure frequency during the 15 weeks to follow-up of this treatment.

The clinical trial was carried out in Mexico over a 22 month period and all patients were referrals from animal hospitals in Mexico City and had reasonably well documented clinical files. The acupuncture treatment protocol was carried out by implanting 2–3 mm gold wire pieces into acupuncture points GB20, GV23, GV21, GV20, GV14, GV16, auricular Shen men, Yin Tang, LI4, LIV3 and ST40. Implants were placed subcutaneously or intramuscularly (depending on the point) using a 20 gauge needle and plunger. All patients received the same treatment. There was no untreated control group due to ethical considerations. Antiseizure medication remained unchanged in patients receiving it already. Treatment and pre-treatment assessment of seizures lasted 15 weeks each.
The number of seizures before and after treatment was compared as well as seizure severity on a 0–20 scale. Owners were trained to grade severity as outlined in this table.

### Grades of seizure severity

<table>
<thead>
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<th>Grades of seizure severity</th>
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<tbody>
<tr>
<td>0</td>
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<tr>
<td>1–5</td>
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<tr>
<td>6–10</td>
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<tr>
<td>11–15</td>
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<tr>
<td>16–20</td>
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<tr>
<td>Absence of seizures</td>
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<tr>
<td>Single seizure lasting &lt;30 s</td>
</tr>
<tr>
<td>Single seizure lasting between 30 s and 1 min</td>
</tr>
<tr>
<td>Single seizure lasting between 1 and 3 min</td>
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<tr>
<td>Generalized tonic-clonic seizure lasting &gt;3 min or cluster seizures</td>
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No side effects attributable to the acupuncture procedure were noted in any of the dogs.

The authors used EEG as a confirmatory test of epilepsy not for diagnosis per se. Interictal paroxysmal discharges in the form of spike waves were found in six of 15 patients (40%) and were regarded as confirmation of epilepsy. Of the six, four had a clear reduction in the number of spike waves in the second EEG recording. The six patients showed 18.2% reduction in the number of seizures and a 23.2% reduction in seizure severity. These values are not outstanding as one patient had an increased number of seizures and evaluation of severity in another was regarded as augmented.

The basis of the treatment was the permanent stimulation of acupuncture points by gold wire. Gold can reduce cytokine expression from macrophages, induce mitochondrial parameters inducing permeability changes and decrease cell membrane potential even at submicromolar concentrations. It is feasible to speculate that some, or all, of these mechanisms are implicated in the effect of gold wire implants in acupuncture points for seizure control (Goiz-Marquez et al 2009).

The authors point out that, in human medicine, efficacy of an intervention of an add-on treatment is measured by a reduction in the base-line frequency and severity of seizures, with a single seizure every six to eight weeks being an acceptable positive response. Another measure proposed is a 100% increase in the interictal period and a 50% reduction in seizure frequency without adverse drug effects. In this trial a beneficial effect was observed in nine of 15 dogs (60%) that had at least a 50% reduction in seizure frequency in the 15 weeks following treatment. This suggests it is feasible to propose incorporation of gold into the treatment or control of idiopathic epilepsy in dogs.

### Effect of a single acupuncture treatment on surgical wound healing in dogs: a randomized, single blinded, controlled pilot study

Saarto et al (2010) carried out a study on 29 dogs after soft tissue or orthopedic surgery. In addition to antibiotics and pain treatment, treated dogs received a single acupuncture treatment straight after surgery and the control group did not. The evaluating veterinarian was blinded to the treatment and evaluated the wounds at three and seven days after surgery in regard to edema (scale 0–3), scabs (yes/no), exudate (yes/no), hematoma (yes/no), dermatitis (yes/no), and aspect of the wound (dry/humid). At three and seven days after surgery, there was no significant difference between the treatment and control groups in the variables. However, at seven days the edema in the treatment group was significantly reduced compared to three days after surgery, possibly due the fact there was more edema in the treatment group at day three (although this difference was not significant.
between groups). The authors concluded that the use of a single acupuncture treatment straight after surgery in dogs did not appear to have any beneficial effects in surgical wound healing.

Clinical effect of additional electroacupuncture on thoracolumbar intervertebral disc herniation in 80 paraplegic dogs

Han et al (2010) investigated the clinical efficacy of electroacupuncture (EAP) and acupuncture, in combination with medication, for the treatment of thoracolumbar intervertebral disc herniation in paraplegic dogs with intact deep pain perception. 37 dogs treated with conventional medicine alone (prednisone) acted as the control group. They were compared to the treatment group of 43 dogs that received EAP, acupuncture and conventional medicine. EAP was applied at GV07 and GV02-1 at 0.5–2.5 mV, mixed Hz of 2 and 15 Hz for 25–30 minutes. Acupuncture was performed locally at urinary bladder meridian points near the lesion and bilaterally distantly at GB30, GB34 and ST36.

Efficacy of treatment was evaluated by post-operative neurologic function, ambulation, relapse, complication and urinary function. Results showed ambulation recovery was greater in the treatment group compared to the control group and time to recovery of ambulation and back pain relief was shorter in the treatment group. Relapse rate was significantly lower in the treatment group. The study suggests that a combination of EAP and acupuncture with conventional medicine is more effective than conventional medicine alone in recovering ambulation, relieving back pain and decreasing relapse. EAP and acupuncture is thus a reasonable option for the treatment of intervertebral disc herniation in paraplegic dogs with intact deep pain perception.

Effects of adjunct electroacupuncture on severity of postoperative pain in dogs undergoing hemilaminectomy because of acute thoracolumbar intervertebral disc disease

Laim et al (2009) compared the severity of postoperative pain in dogs undergoing hemilaminectomy. The controlled clinical trial involved 15 dogs undergoing surgery because of acute thoracolumbar disc disease. Dogs were alternately assigned to a treatment group (conventional analgesics and adjunct EAP) and a control group (conventional analgesics alone). Analgesic treatment was adjusted as necessary by the attending clinician, who was unaware of group assignment. Pain scores were assigned one, three and 12 hours after surgery and every 12 hours thereafter for 72 hours by the same individual who performed acupuncture treatments. The study showed the total dose of fentanyl administered during the first 12 hours after surgery was significantly lower in the treatment group than in the control group, but dosages administered from 12 through to 72 hours after surgery did not differ between groups. Pain score was significantly lower in the treatment group than in the control group 36 hours after surgery, but did not differ significantly between groups at any other time.

The results provided equivocal evidence that adjunct EAP might provide some mild benefit in regard to severity of postoperative pain in dogs undergoing hemilaminectomy due to acute thoracolumbar intervertebral disc disease.

Since the above trial in 2009, three studies have been published on EAP for postoperative pain relief in dogs.

Electroanalgesia for the postoperative control pain in dogs

Cassu et al (2012) evaluated the analgesic and neuroendocrine effects of electroanalgesia in dogs undergoing ovariohysterectomy. Eighteen dogs were randomly placed in three groups to receive either electrical stimuli at acupuncture points (EA); at peri-incisional dermatomes (DER); and at both acupuncture points and peri-incisional dermatomes (EAD). Acepromazine was used pre-operatively (0.05mg kg-1 IV), Propofol (4–5mg kg-1 IV) was used for induction and anaesthesia was maintained with isoflurane. The degree of postoperative pain was measured using a numerical rating scale. Dogs were scored postoperatively at one, three, six, 12 and 24 hours. If the pain score was ≥6, supplemental morphine (0.5mg kg-1 IM) was administered. Serum cortisol concentration was measured before pre-anaesthetic medication (basal) and
postoperatively at one, 12 and 24 hours. The results showed that EA- and EAD-treated dogs, compared to DER-treated dogs, had lower pain scores one hour after surgery, fewer required rescue analgesia and there was no difference in serum cortisol levels between the three groups. The study concluded that pre-operative application of electrical stimuli to acupuncture points isolated, or in combination with peri-incisional dermatomes, provides a reduced postoperative opioid requirement and promotes effective analgesia in dogs undergoing ovariohysterectomy. This reflects similar results by Groppetti et al (2011).

Effectiveness of electroacupuncture analgesia compared with opioid administration in a dog model: a pilot study.

Groppetti et al (2011) investigated the efficacy of EAP compared to butorphanol for postoperative pain treatment in dogs undergoing elective ovariohysterectomy. Twelve dogs were randomly allocated to receive either EAP stimulation at 16 and 43 Hz at acupoints Shen Shu, Chang Shu, He Gu, Tai Yuan, Zu San Li, Yang Ling Quan and Bai Hui (EA), or butorphanol (control). Both cardiovascular and respiratory parameters were recorded during the operation and plasma β-endorphin concentrations recorded up to 24 h after surgery and compared to baseline. A subjective pain-scoring system was used to assess pain in each dog.

The results showed that plasma β-endorphin levels in EA group dogs increased significantly compared to baseline values at one and three hours after surgery. The end-tidal isoflurane concentration required for second ovary traction was significantly lower in the EA group compared to control dogs. All EA dogs experienced prolonged analgesia, over 24 hours at least, while four of six dogs treated with butorphanol needed post-surgical pain relief. The authors concluded there is some evidence for EAP as an alternative technique to provide postoperative analgesia in dogs.

Electroacupuncture versus morphine for the postoperative control pain in dogs

Gakiva et al (2011) compared the postoperative analgesic effects of EAP, morphine or sham acupuncture in dogs undergoing mastectomy. 30 dogs were allocated to receive morphine (TM), EAP (TEA) or sham acupuncture (TSham). Acepromazine (0.05 mg kg-1 IM) was used as a premedication, anaesthesia was induced with propofol (4–5 mg kg-1 IV) and maintained with isoflurane. A numerical rating scale was used to measure postoperative pain. Dogs were scored at one, three, six and 12 hours post-extubation. If the pain score was ≥6, supplemental morphine was administered. Serum cortisol concentration was measured before pre-anaesthetic medication, at 45 minutes after anaesthetic induction, and at one, three and six hours post-extubation. Neither serum cortisol concentration nor pain score differed among the treatments, however rescue analgesia was lower in the TEA group (two of 10 dogs), when compared with TSham (six of 10 dogs) and TM (six of 10 dogs) groups. The researchers concluded that EAP reduces the postoperative analgesic requirement and promotes satisfactory analgesia in dogs undergoing mastectomy.

Acupuncture effects on feline cardiac function

Lin et al (2010) used cardiac MRI (CMRI) as a method of monitoring the effects of acupuncture on the feline cardiovascular system. In a controlled experiment, they monitored the effect of EAP at bilateral acupoint PC6 on recovery time after a ketamine/xylazine cocktail anaesthesia in healthy cats. The CMRI data established the normal baseline feline cardiac function index, including cardiac output. In addition, heart rate, respiration rate, electrocardiogram and pulse rate were measured. The ketamine/xylazine cocktail anaesthesia caused a transient hypertension in the cats; EAP inhibited this anesthetic-induced hypertension and shortened the post-anaesthesia recovery time. The data support the existing knowledge on the cardiovascular benefits of EAP at PC6 and provide strong evidence for the combination of anaesthesia and EAP to shorten post-anaesthesia recovery time and counter...
Case Reports in Veterinary Acupuncture

Acupuncture for idiopathic Horner’s syndrome in a dog

Cho and Kim (2008) made a case report on a one year old female English Cocker with idiopathic Horner’s syndrome of two days duration. Manual acupuncture of ST4 and GB1 (both used for treating facial paralysis in humans) bilaterally with horizontal insertion 10–20 degrees resulted in significant improvement within 24 hours. The prolapsed nictitans membrane completely recovered. A second treatment was carried out on day one and, by day three, clinical signs were absent demonstrating efficacy of acupuncture for this case. A follow up visit one week later was normal.

Acupuncture for locomotor disabilities in a South American red footed tortoise (Geochelone carbonaria)

Scognamillo-Szabo et al (2008) report a tortoise disabled with pelvic limb paralysis for 16 months fully recovered after six acupuncture treatments over a three week period and the improvement persisted for 18 months at follow up. Manual acupuncture involved using acupuncture needles (3.0x 0.25mm) for head points and 29G, 0.5” insulin needles for limb points. The points were translocated from canine points. Session 1 KI1 and GV16; session 2 GB1, KI1 and ST36; session 3 GB20; Session 4 ST36, KI1 and GB20; then sessions 5 and 6 GB34 and BL40. Tongue and pulse and Back Shu points were not evaluated.

Egg binding and hind limb paralysis in an African Penguin

Crouch (2009) reported the acupuncture treatment of a one year old female African penguin that was presented four weeks after post-surgery to remove an egg. The egg had caused paresis and paralysis after which the penguin remained in sternal recumbency for four weeks. The penguin was needled weekly for six weeks using Seirin 0.25 x 30mm needles, retained for five–10 minutes. The points selected were GV14, GB29 and points bilaterally in the long muscles from the scapulae caudally. After two treatments the penguin’s mood and appetite improved and after three treatments pain relief was withdrawn. Following six weeks of acupuncture and rehabilitation, the penguin was more ambulatory and, although never able to walk completely upright again, she was able to function normally, albeit more slowly, except when she was in the water.

References


Recurrent urinary tract infections resolved with cranberry extract

Candace Smette DVM

Abstract

Hunny, a 12 year old spayed female pug, was successfully treated for chronic recurrent urinary tract infections with cranberry extract for over two years. This followed urolith removal at six years old and three or more recurrent urinary tract infections each year since the age of five.

In 2003, Hunny had a urolith removed which consisted of magnesium ammonium phosphate hexahydrate (95% stone and 90% shell). She was placed on Hills Science Diet C/D® for crystal reduction and potassium citrate granules to aid urine alkalinisation to prevent formation of additional uroliths. Hunny continued to suffer urinary tract infections with blood and struvite crystals in the urine. She was treated with antibiotics as above with the addition of chloremphenical 250mg and trimethoprim/sulfamethoxazole at various times.

In 2005, when Hunny was eight, urine was collected via cystocentesis for analysis, culture and sensitivity testing. The culture grew a combination of Escherichia coli, enterococcus group D, beta-hemolytic streptococcus group G and Citrobacter freundii species. Each was >10,000 organisms/ml.

The bacteria were sensitive to the following:

<table>
<thead>
<tr>
<th>Drug</th>
<th>E. coli</th>
<th>Enterococcus</th>
<th>Streptococcus</th>
<th>Citrobacter</th>
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</thead>
<tbody>
<tr>
<td>Amikacin</td>
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<tr>
<td>Ampicillin</td>
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<td>S</td>
<td>R</td>
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<tr>
<td>Baytril (Enrofloxacin)</td>
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<tr>
<td>Cephalothrin</td>
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<tr>
<td>Ceftiofur</td>
<td>S</td>
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<tr>
<td>Neomycin</td>
<td>S</td>
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<td>Clavamox</td>
<td>S</td>
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<td>Gentamicin</td>
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<td>Marbofloxacin</td>
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<td>Orbifloxacin</td>
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<td>SXT</td>
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<tr>
<td>Tetracycline</td>
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<tr>
<td>Erythromycin</td>
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<td>Clindamycin</td>
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<tr>
<td>Penicillin</td>
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</table>
Baytril and Clavamox combination was selected as the antibiotics of choice. Hunny was treated for four months before the infection cleared and remained asymptomatic for a little over a year.

**Treatment**

In 2008, Hunny presented for recurrent urinary tract infections. She had many other issues by this time, such as a recessed vulva, chronic ear infections, corneal epithelialisation and food allergies. The owners wanted to try the antibiotics that worked previously. Infection continued throughout the year, off and on.

In 2009, we received cranberry extract samples and we recommended that Hunny’s owners add the extract to her treatment to help prevent recurrence. Hunny, at 18lb (~8kg), was placed on cranberry concentrate 9:1, 250mg daily. The infection cleared and she was asymptomatic for one year. Hunny then had an infection that cleared up within two weeks on antibiotics and was asymptomatic of urinary tract issues for 18 months. Hunny passed away in 2011 due to complications with congestive heart failure that she developed in 2010.

**Herbal selection and rationale**

<table>
<thead>
<tr>
<th>Family</th>
<th>Ericaceae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts used</td>
<td>Fruit</td>
</tr>
<tr>
<td>Energetics</td>
<td>Astringent (Wynn and Fougere 2007)</td>
</tr>
<tr>
<td>Actions</td>
<td>Antimicrobial (Wynn and Fougere 2007)</td>
</tr>
<tr>
<td>Indications</td>
<td>Historically, cranberry has been used for stomach disorders, vomiting, liver disorders, scurvy and wounds. Recently, cranberry extracts are used in the prevention and treatment of urinary tract infections, bacteriuria, pyuria and cystitis (Wynn and Fougere 2007)</td>
</tr>
<tr>
<td>Constituents</td>
<td>Proanthocyanidins (procyanidins, polyphenols), catechins, epicatechins, cyanid, flavonoids (quercitin, myricetin), organic acids (quinic, malic, glucaronic, ascorbic, citric, benzoic acids), amino acids, peptides and sugars (fructose, D-mannose) (Wynn and Fougere 2007)</td>
</tr>
<tr>
<td>Contraindications</td>
<td>Caution should be used in patients with renal insufficiency (Wynn and Fougere 2007)</td>
</tr>
<tr>
<td>Dose</td>
<td>20mg/kg of dried herb extract daily (divided)</td>
</tr>
</tbody>
</table>

Cranberry extract was chosen due to its antimicrobial actions on the urinary bladder and its ability to reduce adhesion of bacteria to the urinary bladder wall. Although not bactericidal (Natural Standards 2012), the ability of cranberry extract to reduce the adherence of bacteria to the bladder wall helps to flush the bacteria from the body. Cranberry extract has been shown to decrease growth of enterococcus spp in the urine in in vitro studies (Lee 2000) and affect the adhesion properties of streptococcus spp (Toivainen et al 2010) and E. coli (Di Martino et al 2006).

**Results**

With reduction in adherence of three of the four bacteria once determined to be the cause of Hunny’s urinary tract infections, cranberry supplementation was considered a good choice. Hunny did very well on the cranberry supplement, experiencing only one incidence of urinary tract infection which cleared quickly.

**Discussion**

Bacterial urinary tract infections (UTI) are common in dogs; in fact approximately 14% will develop a UTI in their lifetime (KuKanich...
Female dogs are especially prone to UTIs due to their shorter urethra and close proximity to the rectum. Many other factors can affect the occurrence of UTIs in dogs, such as anatomical anomalies (recessed vulvas), reduced immune system and environmental factors. Hunny had multifactorial causes including a recessed vulva, chronic skin infections and chronic use of prednisone.

_E. coli_ is the most common bacterium isolated in canine and feline UTIs and has been isolated from up to 50% infections in dogs and almost 70% infections in cats (KuKanich 2011). The mechanism of action of the cranberry extract constituent proanthocyanidins is to inhibit the adhesion of P-fimbriated _E. coli_ to the uroepithelium of the bladder (Howell 2011). This suggests cranberry supplements are a good alternative to recurrent antibiotics to prevent UTIs.

### Conclusion

My experience of using cranberry for Hunny inspired further interest in herbal medicine. I did not know cranberry was a medicinal herb when I first used it. Since Hunny, I have used cranberry in several patients, all except one with positive outcomes. Cranberry is a supplement that may aid in the prevention of urinary tract infections in dogs.

### References


Ginkgo for Canine Cognitive Dysfunction

Candace Smette DVM

Introduction

With recent advances in technology and increased acceptance of pets as family members, companion animals are living longer than previously. This gives rise to an increasing geriatric population of pets. As they are family members, owners are willing to care for their pets in their senior years. As pets age, their brains show changes analogous to people with Alzheimer’s disease. This condition in dogs is called canine cognitive dysfunction and the debilitating disease is just as stressful for the pet owners as Alzheimer’s is on family members.

Canine cognitive dysfunction is a neurodegenerative disorder causing many behavioral changes. Diagnosis is made by a thorough history and clients’ answers to questionnaires regarding their pets’ behaviors at home. Behavior changes seen in dogs include: loss of house training; pacing or aimless wandering; night-time wakefulness; disorientation either in the house or outside, and altered social interactions with people and other pets in the family. Some owners dismiss these behavioral changes for ‘old age’ and may euthanase a pet due to them.
In a study, Neilson et al. (2001) determined that 23% of dogs aged 11–12 years and 68% of dogs aged 15–16 years had one behavioral change associated with cognitive impairment. Another study found dogs that showed some behavioral dysfunction initially, were likely to become more severely affected within six–18 months, similar to Alzheimer’s (Bain et al. 2001).

Pathophysiology of canine cognitive dysfunction

Pathology of the aging canine brain shares many similarities to aged humans with Alzheimer’s, such as: 1) thickening of the meninges and dilation of the ventricles; 2) age-related gliosis; 3) vascular changes; 4) diffuse plaques, and 5) amyloid deposits (Landsberg 2009). Amyloid plaques are considered the hallmark for Alzheimer’s disease. They contain several proteins but the primary component is beta-amyloid peptide. This has identical amino acid sequences in humans and canines (Landsberg 2009).

In a healthy brain, amyloid plaques are broken down and eliminated but, in an aged brain, they accumulate between neurons. The plaque is a neutotoxin that interferes with nerve conduction in the cerebral cortex (specifically the pre-frontal cortex) and the hippocampus. The pre-frontal cortex is responsible for learning, behavioral actions and social behavior. This explains the gradual loss of these functions as amyloid plaques accumulate within the brain. Thus, the amount of amyloid deposits has been linked to severity of cognitive deficits and behavioral changes in dogs (Landsberg 2009).

The brain is vulnerable to oxidative damage through reactive oxygen species or toxic free radicals. Oxygen is used by mitochondria to produce energy; the by-product is reactive oxygen species, such as hydrogen peroxide, superoxide, oxygen ions and nitric oxide (Landsberg 2009). These free radicals are normally eliminated by enzymes and antioxidants such as vitamins A, C and E. As mitochondria and the body age, they are less effective at producing energy and produce more reactive oxygen species. These build up in the brain and react with DNA, lipids and proteins causing cell damage, mutations and even cell death. Compounds that prevent free radical production, or destroy them, delay programmed cell death and may augment cognitive dysfunction (Overall 2002).

Dopamine is a catecholamine neurotransmitter found in the brain that plays a major role in behavior, cognition, voluntary movements, motivation, sleep patterns, attention, working memory and learning. Monoamine oxidases (MAO) are enzymes found on the outer membrane of mitochondria and are responsible for metabolising dopamine, other catecholamines and serotonin. In canine cognitive dysfunction and Alzheimer’s, there is an increase in MAOs and a decrease in dopamine. Due to increased MAO activity, dopaminergic neurons are unable to maintain production, undergo some reduction and are invariably associated with motor and cognitive defects (Overall 2002). MAO inhibitors prevent the breakdown of useful monoamine neurotransmitters, such as dopamine.

There may be a connection between vascular insufficiency, decreased perfusion and signs of aging in dogs (Landsberg 2009). Microhemorrhages, or infarcts, have been found in vessels around the ventricles in older dogs. Arteriosclerosis may be seen in the older dog or cat due to fibrosis of vessel walls, endothelial proliferation, mineralisation and beta amyloid deposition (Landsberg 2009). These abnormal findings in blood vessels compromise blood flow within the brain.

Diagnosis and treatment

Currently there is no specific diagnostic test for canine cognitive dysfunction. Veterinarians must rely on owner history for a diagnosis. A complete physical examination and blood analysis should be done to rule out other causes, such as: arthritis leading to reduced socialisation and activity; hypothyroidism causing reduced activity and behavioral disturbances, and dental disease. The acronym DISHA has been used to describe clinical signs associated with canine cognitive dysfunction: 1) Disorientation; 2) Altered Interactions with people or other household pets; 3) Altered Sleep patterns; 4) House soiling, and 5) Activity.
There is no cure for either Alzheimer’s or canine cognitive dysfunction, however, medications can help slow progression of the diseases. The only FDA-approved medication in the United States is Selegline (L-deprinyl, Anipryl®, Pfizer) and Senilife® is approved in the United Kingdom. Canine Hill’s Science Diet b/d is also an approved FDA therapeutic agent for canine cognitive dysfunction.

Several other modalities have been studied for treating both Alzheimer’s and canine cognitive dysfunction, such as: *Gingko biloba*, vitamin E, diet, behavioral games, plus environmental and behavioral modifications within the household. The treatment goal is to reduce symptoms and slow progression of the disease.

**Ginkgo biloba**

Also called the Maidenhair tree, *Ginkgo biloba* is a large shade tree native to China and now grown around the world. It is thought to be one of the oldest living trees and is naturally very resistant to parasites and disease, which explains why it can live for a thousand years. Over millennia, the leaves and seeds have been used for various conditions in humans, including: memory and concentration problems; dementia; altitude sickness; cardiovascular disease; macular degeneration; tinnitus; headaches; and asthma. Most commonly, Ginko leaves are used for their anti-inflammatory and cognitive enhancement actions. Today, it is one of the top-selling herbs in the United States (Natural Standards 2012).

The *Ginkgo biloba* leaf contains two major active constituents: a Ginkgo flavonoid (a glycoside) and the two primary terpenoid lactones, ginkgolides and bilobalide (Natural Standards 2012). Minor constitutes, such as organic acids, tannins and sugars, are present and may play a synergistic role in the clinical action of Ginkgo. The flavonoid portion of EGb 761 is thought to be responsible for antioxidant activity by acting as a free radical scavenger (Natural Standards 2012). This results in less damage to DNA, proteins and cells within the brain.

Ginkgolides functions to increase vasodilation and circulation by stimulating the endothelium-derived relaxing factor (Natural Standards 2012). Since mitochondria are less efficient at using oxygen as they age, this action increases oxygen availability to the cells and mitochondria. Ginkgolides also inhibits receptor binding of platelet-activating factor (Natural Standards 2012). Platelet-activating factor is a pro-inflammatory agent responsible for blood vessel dilation and platelet aggregation. Bilobalide functions to protect and repair nerve cells (Kiewert 2007).

*Ginkgo biloba* also acts as a monoamine oxidase inhibitor (White 1996). By inhibiting this enzyme, it prevents breakdown of dopamine. Further, it inhibits beta-amyloid plaque formation (Lou et al 2002) – the hallmark in Alzheimer’s and canine cognitive dysfunction. By preventing formation of this neurotoxin, it is believed to reduce symptoms of both diseases.

**Case reports**

*Ginkgo biloba* leaf extract was standardised in the 1970s and since has been extensively studied. Two main standardised extracts are used for studies of Ginkgo today. EGb 761 contains 24% ginkgo glycosides plus 6% terpenoids and is probably the most commonly studied. LI 1370 contains 25% ginkgo flavone glycoside plus 6% terpenoids (Natural standards 2012).

Many clinical studies of *Ginkgo biloba* extracts and of its constituents (flavonoids, ginkgolides and bilobalide) have been performed in laboratory animals and humans for various actions and specific diseases, such as Alzheimer’s and dementia in humans. Over 50 human trials have been published specifically for treating dementia in humans (Natural Standards 2012). Many earlier studies, however, did not employ current standards of double-blind, randomised clinical trials. There are far fewer studies on cognitive dysfunction in dogs.

Since canine cognitive dysfunction and Alzheimer’s are neurodegenerative diseases with many similarities, it has been hypothesized we could use the canine brain to study Alzheimer’s. A few studies indicate the canine aging brain can be a model for human neurodegenerative
diseases. One compared similarities, including: that aged dogs display many cognitive impairments associated with aging and dementia in humans, and that aged dogs display variability in cognitive function (Adams et al 2000). Another study examined the link between oxidative damage, aging and beta amyloid plaques in 19 beagles. It showed that evidence of widespread oxidative damage and beta amyloid deposition is further justification for a canine model for human brain aging and neurodegenerative diseases (Head et al 2002).

Senilife® is a nutraceutical supplement containing 50mg standardized *Ginkgo biloba* extract to help improve behavioral changes associated with brain aging. It is approved for both dogs and cats. Senilife® also contains 25mg phosphatidylserine, 33.5mg d-alpha tocopherol and 20.5mg pyridoxine per capsule (Osella 2007).

An early study on Senilife® was performed by Colangeli et al (2005). Owners were given questionnaires regarding their dogs before and after 90 days on Senilife®. Of the 32 dogs that completed this study, 66% showed at least 50% improvement in owner-observed behavioral signs. There was a greater rate of improvement in behavioral signs in the younger group (seven–10 years) at 72%, versus the older group (>10 years) at 44%.

A 2007 84-day study of 75 dogs with canine cognitive dysfunction resulted in marked improvement of behavioral DISHA-related symptoms, although some dogs did not have complete remission of signs (Osella 2007). This study, however, did not appear to have a control group and was determined upon owner observation of their dog.

In 2008, a small study with Senilife® used only eight dogs ranging from seven to 12 years, but was a blinded crossover design. Thus, treated dogs in the first group became the control in the second half of the study and vice versa. Performance accuracy was improved in supplemented dogs compared with control dogs indicating that Senilife® can improve memory in aged dogs. This study showed the second group of treated dogs had greater improvement, possibly indicating there is a prolonged effect of the medication or there was learned performance of the tests (Araujo et al 2008).

Reichling et al (2006) studied Ginkgo leaf extract for its effects on canine cognitive dysfunction. This was an open clinical trial, conducted over eight weeks, in 10 veterinary practices with 42 dogs averaging 11 years of age. A significant reduction in behavioral disturbances was shown at the end of the study.

Owners reported seeing an improvement in their dogs after four weeks. Reichling et al concluded that Ginkgo leaf extract appeared to be a safe dietary supplement for elderly dogs with age-related behavioral signs.

### Conclusion

*Ginkgo biloba* leaf extract is considered in human medicine to be an effective therapeutic agent for prevention of Alzheimer’s and dementia, with an evidence grading A (Natural Standards 2012).

On the basis of human studies, *Ginkgo biloba* has recently been considered in the veterinary world as a treatment for aging canine patients and canine cognitive disorders. Although there are only few, inadequate studies of Ginkgo in dogs, they indicate a promising look into its future use for aging-brain-related behavioral disorders.

“I LOVE the course. It is amazing. I’ve studied TCVM for 15 years – including four years of human acupuncture college – and I think that I am learning more in the CIVT course than I learned in all those years…”

CIVT student
Marguerite Hernandez
VMD
References


The Use of Milk Thistle (Silybum marianum) in Veterinary Medicine

Rebecca Jester

Milk thistle, or Silybum marianum, has been used for centuries for its recognised hepatoprotective effects, however recently several other indications for its usage have surfaced. An extensive search on PubMed revealed some animal-related and human-related articles that give insight to milk thistle’s likely contribution to veterinary medicine. These are explored below by individual topic.

Anticancer

Two-year toxicity studies on the widely used herbal products goldenseal and milk thistle were conducted by Dunnick et al (2011) in male and female F344/N rats and B6C3F1 mice. With goldenseal root powder, the primary finding was an increase in liver tumors in rats and mice and with milk thistle extract, a decrease in spontaneous background tumors including mammary gland tumors in female rats and liver tumors in male mice. Increased tumorigenicity in rodents exposed to goldenseal root powder may be due in part to the topoisomerase inhibition properties of berberine, a major alkaloid constituent in goldenseal, or its metabolite, berberrubine. In the clinic, use of topoisomerase-inhibiting agents has been associated with secondary tumor formation and inhibition in DNA repair processes. In contrast, the radical scavenging and antioxidant properties of silibinin and other flavonolignans in milk thistle extract may have contributed to the decrease in the rodents’ background tumors in the present studies.

Although the findings above may lead to further questions in evaluating long-term use of golden seal and other berberine containing herbs, the overall suppression of tumor formation in rats and mice treated with silibinin is of clinical significance. Cancer treatment of companion animals is just as frustrating as that of humans. An herb that potentially suppresses tumor formation, even without knowing specific mechanisms, could be considered in the arsenal of treatments for cancer.

Zhao and Agarwal (1999) conducted a study in mice to determine the distribution and conjugate formation of systemically administered silibinin in liver, lung, stomach, skin, prostate and pancreas. An additional study was performed to assess the effect of orally administered silibinin on phase II enzyme activity in liver, lung, stomach, skin and small bowel. Together, results demonstrated the bioavailability of, and phase II enzyme induction by, systemically administered silibinin in different tissues, including skin, where silymarin (SM) has been shown to be a strong cancer chemopreventive agent.

The authors concluded that further studies are warranted to assess the cancer preventive and anticarcinogenic effects of silibinin in different cancer models.

Anti-inflammatory

A mixture of flavonolignans, SM is comprised of three isomers. In a study by Gupta et al (2000), SM was evaluated and found to have significant anti-inflammatory and anti-arthritic activities. Study rats had papaya latex and mycobacterial adjuvant-induced inflammation. The mechanism of action for these joint related effects was via inhibition of 5-lipoxygenase.

With the aging population of pets and the prevalence of arthritis, another potential anti-inflammatory treatment would be welcome.
Antimicrobial

In a study evaluating the multidrug resistant (MDR) pump of *Staphylococcus aureus*, Stermitz et al (2000) discovered a new method to measure the activity of an inhibitor. A bioactivity-directed fractionation method resulted in isolation of flavolignan 2 and porphyrin 3 from berberine-containing Berberis species. These compounds are devoid of *S. aureus* antibacterial activity alone, but form potent synergistic couples with a subinhibitory concentration of berberine. Silybin, another natural flavonolignan, was also shown to be a bacterial MDR pump inhibitor.

A study by Kang et al (2011) revealed promising effects of silibinin – it was effective against isolates of methicillin-resistant *S. aureus* (MRSA). Silibinin was evaluated against 20 clinical isolates of MRSA, either alone or in combination with ampicillin or oxacillin, using a checkerboard assay. Silibinin exhibited good activity against isolates of MRSA and minimum inhibitory concentrations (MIC) for the combination of silibinin plus oxacillin or ampicillin were reduced ≥4-fold against the MRSA isolates tested. This demonstrated a synergistic effect as defined by a fractional inhibitory concentration index of ≤0.5. Furthermore, a time-kill study evaluating the growth of the tested bacteria showed growth was completely attenuated after two to five hours of treatment with the ½ MIC of silibinin, regardless of whether it was administered alone or with oxacillin (½ MIC) or ampicillin (½ MIC).

The potential usefulness of milk thistle for age-related brain changes is highly relevant to the field of veterinary medicine as cognitive changes are seen in the geriatric animal population.

Dermal

It is well documented that ultraviolet (UV) light-induced immune suppression and oxidative stress play an important roles in the induction of skin cancers. Katiyar (2002) devised a study to define the mechanism of SM’s prevention of skin cancer, by employing immunostaining, analytical assays and ELISA. These revealed that topical treatment of SM (1mg/cm² skin area) to C3H/HeN mice inhibits UVB (90mJ/cm²)-induced suppression of contact hypersensitivity (CHS) response to contact sensitizer dinitrofluorobenzene. Prevention of UVB-induced suppression of CHS by SM was found to be associated with the inhibition of infiltrating leukocytes, particularly CD11b+ cell type and myeloperoxidase activity (50-71%).

Behavior and brain function

Flavonoids, such as those found in SM, are antioxidant molecules capable of intercepting reactive oxygen species (ROS). Oxidative stress (OS) is caused by imbalance between antioxidant defenses and production of ROS causing oxidative damage to macromolecules. The brain is susceptible to oxidative stress and it is associated with age-related brain dysfunction. The study by Galhardi et al (2009) evaluated the effect of SM on biochemical parameters that evaluate OS in aged and young rat brain. Rats were treated with SM at doses of 200 and 400mg/kg/day (SM200 and SM400). Both doses appeared effective in reducing oxidised proteins in the aged brain. These results suggest SM may contribute to the prevention of aged-related and pathological-degenerative processes in the brain.
SM treatment significantly reduced UVB-induced immunosuppressive cytokine interleukin-10 producing cells and their production (58–72%, p<0.001). Topical treatment with SM resulted in significant reduction of the number of UVB-induced H2O2 producing cells and inducible nitric oxide synthase expressing cells concomitant with decrease in H2O2 (58-65%, p<0.001) and nitric oxide (65–68%, p<0.001) production. These data suggest that prevention of UVB-induced immunosuppression and oxidative stress by SM may be associated with the prevention of photocarcinogenesis in mice.

Veterinary species may not experience skin cancers with the same frequency as humans, but they exist. Other conditions, such as discoid lupus, result in insults to the skin which becomes a greater target for abnormalities. SM may be a tool to maintain the dermal cells in a state of appropriate immune response in these cases.

### Hepatic effects

The following two studies may demonstrate why there has been longstanding use of milk thistle for hepatoprotective effects.

1. Inflammation and oxidative stress are associated with liver injury and development of liver disease. In this study, Au et al (2012) evaluated whether primary canine hepatocytes pretreated with the combination of S-adenosylmethionine (SAMe, 30 and 2000ng/ml) and silybin (SB, 298ng/ml), agents with known anti-inflammatory and antioxidant properties, could attenuate IL-1β-induced inflammation and oxidative stress. The SAMe and SB combination reduced cytokine-induced PGE(2), IL-8 and MCP-1 production while also inhibiting NF-κB nuclear translocation. These changes were accompanied by increased antioxidant enzyme-reduced glutathione comparable to control levels. The study shows for the first time that the SAMe and SB combination inhibits both inflammation and oxidative stress through two separate signaling pathways.

2. A study by Skorupski et al (2011) with the combination product Denamarin considered the usefulness of the CCNU (chemotherapeutic agent Lomustine) chemotherapy protocol. This was because increases in liver enzymes occur in up to 86% of dogs receiving CCNU which can result in treatment delay or early discontinuation. Dogs eligible for the study had: lymphoma, mast cell tumor, or histiocytic sarcoma; had been prescribed CCNU with or without corticosteroids; and had normal ALT activity. Dogs were prospectively randomised to receive either Denamarin during CCNU chemotherapy or CCNU alone. Liver-specific laboratory tests were run before each dose of CCNU.

Results demonstrated increased liver enzyme activity occurred in 84% of dogs receiving CCNU alone and in 68% of dogs on concurrent Denamarin. Dogs receiving CCNU alone had significantly greater increases in ALT, aspartate aminotransferase, alkaline phosphatase, bilirubin and a significantly greater decrease in serum cholesterol concentrations than dogs receiving concurrent Denamarin. Dogs receiving CCNU alone were significantly more likely to have treatment delayed or discontinued because of increased ALT activity. These results support the use of concurrent Denamarin to minimise increased liver enzyme activity in dogs receiving CCNU chemotherapy. Denamarin treatment also increases the likelihood of dogs completing a prescribed CCNU course.

The aim of the study by Raskovic et al (2011) was to investigate, evaluate and confirm the potential cardioprotective and hepatoprotective effects of administration of SM – rich in silibinin – at a dose of 60mg/kg orally for 12 days on doxorubicin-induced toxicity in male Wistar rats. The in vivo model was used to explore whether SM could prevent damage of liver and heart tissue induced by doxorubicin administered every other day at the dose of 1.66 mg/kg intraperitoneally for 12 days. The study examined change of body weight, ECG changes, biochemical parameters of oxidative stress, serum activity of alanine and aspartate transaminase, lactate dehydrogenase, creatine kinase and histological preparations of heart and liver samples of treated animals. Physiological, pharmacological, microscopic and biochemical results confirmed that, at the examined dose, SM exhibits a protective influence on heart and liver tissue against toxicity induced by doxorubicin.
While a large number of veterinary patients are small companion animals, we must not forget farm animals. In a study by Tedesco et al (2004), the use of SM in periparturient cows was evaluated. Ten treated and 10 control pregnant dairy cows were paired by parity, body condition score, health condition and previous milk production. Treatment consisted of daily 10g/animal SM extract as oral drenches, from 10 days prior to the calving date to 15 days after calving. Blood samples and liver biopsies were taken from each animal at seven and 30 days after calving. Hepatic functions were evaluated by assay of plasma beta-hydroxybutyrate, total cholesterol, high-density lipoproteins, low-density lipoproteins, triglyceride and total bilirubin. Liver histology was assessed via biopsies.

Clinical chemistry values were similar for both groups and effects at different times (day seven versus day 30, p<0.05) were attributed to physiological variations in periparturient cows. Histology showed fat accumulation in the liver of both groups, as is expected in periparturient dairy cows. In treated cows, fat-rich hepatocytes were observed near the central vein. Observations suggest that, at the dosage used, SM extract has no adverse effect on the liver of lactating cows and presents no objective evidence for a hepatoprotective effect in this species. Further evaluation of milk thistle and different dosages may be warranted as this study provided no conclusive reports in support of the use of SM in the bovine species. It may be worth considering if the ruminant digestive tract renders the herb less useful.

**Kidney disease**

Drug-induced nephrotoxicity is an important cause of renal failure in dogs. Aminoglycoside antibiotics, such as gentamicin, can produce nephrotoxicity in dogs due in part to an imbalance of pro- and antioxidants (oxidative stress). SM has potentially beneficial antioxidant properties. Varzi et al (2007) took a control group (saline, group 1, n=5) and compared them with dogs administrated gentamicin by intramuscular injection, at a dosage of 20 mg/kg, once daily for nine days (groups 2-5, n=5/group). The effects of vitamin E (group 3) and SM (group 4) alone and in combination (group 5) were compared for induced nephrotoxicity. Renal function was assessed using serum biochemical markers (creatinine and urea). Malondialdehyde (MDA) concentration was measured as a marker of lipid peroxidation. The activity of total serum antioxidants (TSAO) was assessed as a marker of antioxidant defenses.

Serum creatinine and urea concentrations were increased significantly and TSAO was decreased significantly in group 2 compared with group 1. Serum creatinine concentrations, but not urea concentrations, were significantly lower in groups 3 and 4 than in group 2 (p=0.001). Serum MDA concentrations was significantly different between groups 2 and 3 (p=0.01), 2 and 4 (p<0.001) and 4 and 5 (p=0.01). TSAO activity was significantly in group 4 (SM) than in group 2 (p=0.002). Results of the study suggest SM and vitamin E decreased gentamicin-induced nephrotoxicity in dogs.

**Metronidazole**

As a follow-up to a study regarding the efficacy of antiprotozoal drugs against canine giardiasis, Chon et al (2005) evaluated the therapeutic efficacy of metronidazole alone, or combined with SM for two weeks to treat canine giardiasis. To observe effects on nutrition, they investigated changes of body weight, serum biochemical indicators for liver inflammation (GOT, GPT, NH3), liver cell regeneration indicators (total protein, albumin) and hematological changes during treatment (WBC, RBC, MCV, MCH and MCHC). Dogs were allocated to four groups; one was treated with SM (3.5 mg/kg sid, oral), another with metronidazole (50 mg/kg sid, oral) and the other group with SM (3.5 mg/kg sid, oral) plus metronidazole (50 mg/kg sid, oral), while control group remained untreated.
Feecal samples from each dog in each group were examined three times a week for two weeks using the ZSCT and giardia antigen test kit (SNAPR Giardia, IDEXX Laboratories). Dogs were considered to have giardiasis when one or more fecal samples had positive results for giardia cysts.

Seven days after treatment, the efficacy of SM plus metronidazole was 79%, whereas metronidazole was 72%. Ten days post-treatment the efficacy of metronidazole plus SM (91%) was significantly different in comparison with that of metronidazole (75%). Two weeks post-treatment no cysts were detected in the fecal samples in dogs of the metronidazole or SM plus metronidazole-treated groups. Fecal samples of all dogs in the control and SM-only treated groups were giardia positive. Signs of side effects were not observed in SM plus metronidazole-treated dogs. Poor appetite and intermittent vomiting signs were observed in two dogs of the metronidazole-treated group that resolved when metronidazole administration was discontinued. The body weight of those treated with metronidazole was significantly decreased in comparison with those treated with SM and metronidazole plus SM. There were significant differences of body weight between dogs treated with SM and metronidazole.

Two weeks after metronidazole treatment, serum concentration of GOT, GPT and NH3 were significantly increased in comparison with those treated with SM. On the other hand, serum concentration of GOT, GPT and NH3 were not significantly increased when treated with SM plus metronidazole compared to those treated with metronidazole.

Serum total protein and albumin concentrations were decreased after metronidazole treatment as compared to dogs treated with SM and SM plus metronidazole. Concentrations of serum total protein and albumin decreased significantly in the metronidazole-treated group compared to dogs treated with SM. WBC and RBC did show significant differences in the dogs treated with metronidazole, while MCV, MCH were significantly different between SM and metronidazole-treated dogs. There were no significant differences in MCHC in any groups. These data suggest that SM, in supplement with antiprotozoal drugs, can influence the therapy of canine giardiasis.

Treatment of giardia is highly relevant clinically relevancy as diagnosis occurs regularly in veterinary clinics. The implications of SM in combination with metronidazole for other conditions, eg IBD, would be worth investigating clinically and from a research perspective.

Pancreatic disorders

Silibinin, the main component of SM in milk thistle extract, was evaluated for its organ protective properties. Possibly due to their antioxidant and membrane-stabilising properties, the compounds have been shown to protect different organs and cells against a number of insults. Liver, kidney, erythrocytes and platelets have been protected from the toxic effects of ethanol, carbon tetrachloride, cold ischemia and drugs. The effect of silibinin on the endocrine and exocrine pancreas has not been studied. To remedy this, von Schonfeld et al (1997) investigated whether silibinin treatment attenuates cyclosporin A (CiA) toxicity on rat endocrine and exocrine pancreas. Groups of 15 male Wistar rats were treated for eight days with CiA and/or silibinin. On day nine, endocrine and exocrine pancreatic functions were tested in vitro. At the end of the treatment period, blood glucose levels in vivo were significantly higher in rats treated with CiA, while silibinin did not affect glucose levels. In vitro, insulin secretion was inhibited after treatment with silibinin, but amylase secretion was not affected. After treatment with CiA both insulin and amylase secretion were reduced.

Silibinin and CiA had an additive inhibitory effect on insulin secretion, but silibinin attenuated CiA-induced inhibition of amylase secretion.

Despite CiA treatment, amylase secretion was restored to normal with the highest dose of silibinin. Thus silibinin inhibits glucose-stimulated insulin release in vitro, while not affecting blood glucose concentration in vivo. This combination of effects could be useful in the treatment of non-insulin-dependent diabetes mellitus. Silibinin protects the exocrine pancreas from CiA toxicity and as this inhibitory effect is probably unspecific, silibinin may protect the exocrine pancreas against other insults.
Oxidative stresses are increasingly implicated in the pathogenesis of diabetic complications which may either cause direct pancreatic beta-cell damage or lead to metabolic abnormalities that can induce or aggravate diabetes. The valuable effect of antioxidant nutrients on the glycemic control of diabetic patients has been reported in experimental and clinical studies. The following study was designed to investigate the effects of the herbal medicine, silymarin, known to have antioxidant properties, on the glycemic profile in diabetic patients.

A four-month randomized double-blind clinical trial was conducted in 51 type II diabetic patients in two well-matched groups. The first group (n=25) received a SM (200mg) tablet tid plus conventional therapy. The second group (n=26) received the same therapy and a placebo instead of SM. Patients were visited monthly and glycosylated hemoglobin (HbA(1)c), fasting blood glucose (FBS), insulin, total cholesterol, LDL and HDL, triglyceride, SGOT and SGPT levels were determined at the beginning and end of the study. Results showed a significant decrease in HbA(1)c, FBS, total cholesterol, LDL, triglyceride SGOT and SGPT levels in SM-treated patients compared with placebo, as well as with values at the beginning of the study in each group. In conclusion, SM treatment in type II diabetic patients for four months has a beneficial effect on improving the glycemic profile (Huseini et al 2006).

Conclusion

The use and implication of importance of S. marianum from milk thistle extends far beyond its previously viewed role of hepatoprotectivity. Despite the orientation of these studies toward the use of a standardised constituent, usage of S. marianum in herbal formulations as the entire plant may allow for just as effective, if not more effective, therapy in veterinary patients. Recognition of the synergism and art of herbal formulation for each individual patient will only come after greater acceptance in western allopathic-based medical society of the power of plant medicine.

References


**Research Updates**

Saliva as a topical ointment and plant eating in young dogs


Licking: use of the medicine cabinet in the mouth

As an adaptation to the potential risk of infection, animals of several species readily lick their wounds. The coating of saliva contains a number of antibacterial and wound-healing substances including lysozyme, lactoferrin, leucocytes, lactoperoxidase and immunoglobins along with epidermal growth factors. Saliva is a readily available, all-purpose medicinal ointment. As an indication of the effectiveness of this treatment, saliva of dogs was found to be bactericidal to both *Escherichia coli* and *Streptococcus canis*, common wound contaminants. Sows are observed to generously lick their nipples just before piglets start to suckle, applying a salivary wash that is bactericidal for common disease-causing pathogens.

Plant eating by dogs

Plant material has been found in 2–4% of scats and stomach content samples of wolves and cougars, revealing they regularly consume non-digestible plants. Looking for evidence that plant eating in dogs evolved as a means of intestinal parasite control, rather than reflecting a dietary deficiency or a way of inducing vomiting in sick dogs (as commonly believed), a broad ranging web-based survey of thousands of dog owners was posted.

It was found that only 9% of the plant-eating dogs regularly appeared ill prior to eating plants and only 22% regularly vomited afterwards – the great majority appeared normal. An important finding was that dogs under one year of age ate plants much more frequently than the older dogs and were even less likely to appear ill beforehand or vomit afterwards. In nature, the young are most vulnerable to intestinal parasites, having not developed some adult-like immunity to the worms and being more vulnerable to the loss of blood from parasites.
A comparison of plant eating by dogs up to one year of age and 3–13 years of age:

(a) The younger dogs eat plants more frequently

(b) Not only do younger dogs appear ill beforehand less frequently, they also rarely vomit afterwards. These differences reflect an apparent innate developmental adaptation to the young being more vulnerable to the costs of intestinal parasites and eating parasite-purging plants more frequently (Sueda K, Hart B and Cliff K 2008).

Veterinary applications of *Echinacea pupurea*


Most domestic animals, including pets, livestock and fish, require treatment at some point in their lives for viral and microbial diseases. The causative organisms are usually analogous to corresponding human counterparts, for example, avian influenza viruses, animal herpes viruses, various respiratory viruses and bacteria, plus many fungal and parasitic infections. Consequently, some of them should be responsive to Echinacea treatment, either as direct antivirals, antimicrobials, or as an anti-inflammatory agent.

Some of these organisms, especially bacteria such as Salmonella and Campylobacter species, are important sources of contaminated foods. Some commentators have pointed out the need to evaluate herbal preparations as replacements for at least part of the antibiotic onslaught that farmed animals often receive.

Certain herbs, including Echinacea, have a modern tradition of veterinary applications in North America and Europe. Although relatively few reports have described basic studies analogous to those described for human diseases, or even controlled trials in animals, invariably the treatments were concluded to be safe and free of significant side effects. This is supported by studies in mice and rats in which toxic effects were not observed.

A study in chicks infected with the protozoan parasite Coccidia concluded that dietary supplementation with Echinacea root extract significantly decreased lesion scores and improved the chicks’ health, in comparison with animals raised on a normal diet. Immune parameters were not measured so it is not clear if the effect of Echinacea was directed against the parasite itself or on the immune system. Nevertheless an effective treatment for coccidiosis would be welcome in the poultry industry.

In a study in young pigs, dietary Echinacea was found to offer no protection against the porcine reproductive and respiratory syndrome virus (PRRS virus). Since this virus is a member of
the arterivirus family (related to coronaviruses) and possesses a membrane, it would be expected to be susceptible to direct contact with Echinacea. However the systemic nature of the infection could render it inaccessible to dietary Echinacea components. Alternatively, the treatment protocol might have been inadequate.

In addition to controlling infections in domestic animals, herbal preparations have been advocated for such things as immune stimulation, growth promotion and performance enhancement. Studies carried out in uninfected horses and fish (Tilapia) suggest possibilities for Echinacea preparations. Again safety was not considered a problem for the animals. Fish, like other farmed animals, are potentially vulnerable to viral and microbial infections, especially under conditions of stress, therefore alternative treatments to synthetic antimicrobials could be useful.

Du Huo Ji Sheng Tang for osteoarthritis


Currently, there is not a cure for osteoarthritis (OA) and available treatments only slow the progression of disease. For the last 20 years, Traditional Chinese Medicine (TCM) has seen significant advancement against OA, such as in improving patients’ clinical findings, inhibiting inflammatory reaction and cartilage degeneration. In vivo and in vitro study showed that Chinese herbs provide multiple comprehensive actions against OA. Du-Huo-Ji-Sheng-Tang (DHJST) has been widely used for treating OA. It is composed of: Radix angelicae pubescentis; Herba taxilli; Radix acanthopanacis bidentatae; Herba asari; Radix gentianae macrophyllae; Cortex cinnamomi, and Poria. DHJST can improve clinical symptoms, knee function and quality of life for patients.

The researchers investigated the effect of DHJST on preventing cartilage degeneration of OA in rabbits with anterior cruciate ligament injury and observed its mechanisms. There was a significant histological degeneration in the control group compared with the treatment group and normal controls. The study indicated that DHJST exerts a significant therapeutic effect on OA through inhibiting chondrocyte apoptosis and regulating VEGF expression in chondrocytes (VEGF contributes to pain and swelling) and HIF-1a in chondrocytes (HIF-1a increases apoptosis in chondrocytes).

Bees up to date


Across the Northern hemisphere, managed honey bee (Apis mellifera) colonies are currently affected by abrupt depopulation during winter. Many factors are suspected to be involved, either alone or in combination. Parasites and pathogens are considered principal actors, in particular the ectoparasitic mite Varroa destructor, associated viruses and the microsporidian Nosema ceranae.

Long-term monitoring of colonies and screening for eleven disease agents and genes involved in bee immunity and physiology were used to identify predictive markers of honey bee colony losses during winter. The data show that DWV, N. ceranae, V. destructor and Vitellogenin can be predictive markers for winter colony losses, but their predictive power strongly depends on the season.

The data support that V. destructor is a key player for losses, in line with its specific impact on the health of individual bees and colonies. It has been shown that V. destructor or its associated microbes can affect the immune system of parasitised bees. In addition, viral infections linked with V. destructor are generally considered as a major cause of bee losses. V. destructor plays a central role as a mechanical and biological vector of several viruses.
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