

Clinical Management of Equine Recurrent Airway Obstruction with a Combination of Electroacupuncture and Chinese Herbal Therapy

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ABSTRACT

A seven year Arabian gelding was diagnosed with lower airway inflammatory disease and recurrent airway obstruction (RAO) 2 year prior to presentation. Despite temporary improvement of the clinical signs with nasal inhalation of corticosteroids and bronchodilators, the RAO would relapse if the medications were reduced. The client feared deleterious long term effects of the medication. Acupuncture and Chinese herbal therapy were initiated to reduce the need for conventional medication. Acupuncture treatment was initiated using dry needles at *Bai-hui*, BL-26, BL-23 and GV-14. Electroacupuncture was performed at CV-17, CV-22, LU-1, Ding-chuan, BL-13, *Fei-men*, GV-14, *Fei-pan*, and *Fei-shu*. Two Chinese herbal formulas Lily Combination based on the classical formulation *Bai He Gu Jin Tang* and *Breath Easer* based on the classical formulation *Ge Jie San* were initiated. Improvement was noted within 2 weeks. Bronchodilators and nasal corticosteroids were discontinued after 6 weeks and the clinical signs were controlled with monthly acupuncture treatments and daily herbal therapy.

Key words: Acupuncture, electroacupuncture, heaves, recurrent airway obstruction, Chinese herbal therapy

Recurrent airway obstruction (RAO) also called heaves is the most common chronic respiratory problem in performance horses. It has been estimated that more than 54% of the horses housed in stables are affected by either sub-clinical or moderate RAO.¹ The causes of ROA are multifactorial. The disease is more commonly diagnosed in older horses. Thoroughbreds have been found to be three times more susceptible than ponies and the disease has seasonal variation.² Acupuncture has been used successfully to treat asthma in humans.³ Electroacupuncture had been demonstrated to reduce pulmonary perivascular and peribronchial inflammatory cell infiltration and reduce the total cell count of bronchoalveolar lavage (BAL) in ovalbumin induced bronchial asthma in an experimental rat model.⁴ The following case report illustrates the successful clinical management of equine RAO with electro-acupuncture and Chinese herbal medicine supplementation.

A seven year Arabian gelding used as a pleasure horse was diagnosed with lower airway inflammatory disease and heaves 2 year prior to

presentation. The diagnosis had been based on the clinical signs of dyspnea and coughing and endoscopic examination, BAL and cytological examination. The clinical signs of dyspnea and coughing were controlled with standard conventional medical management and by providing a dust free environment. Medical management included a bronchodilator and nasal inhalation of corticosteroids. Despite temporary improvement of the clinical signs, the RAO would relapse if the medications were reduced and discontinued. The owner feared possible side effects of immune suppression and laminitis from chronic corticosteroid administration, therefore the horse was presented for evaluation and treatment with acupuncture and Chinese herbal therapy.

On the initial presentation for the Traditional Chinese Veterinary Medical (TCVM) evaluation the main clinical complaints included coughing, wheezing respiratory sounds, and a slow recovery of the respiratory rate after exercise. The horse was stabled in an open barn with two other horses. Stable management included a well ventilated environment with a base of soil with wood shavings as bedding. The horse was fed a commercial horse pellet twice a day. Good quality hay was available almost all day while the horse was kept in the stall. The respiratory rate was 35/minute. Coughing

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predominated after feeding time which was manifested as a series of dry coughs and wheezing sounds during respiration. The horse had developed a prominent heave line in the ventral abdominal wall, indicative of a chronic condition.

On the TCVM clinical examination the tongue color, pulse characteristics, and ear temperature were evaluated. The tongue was thick with a purple color. The pulses were weaker on the left, and the ears and body temperature were warm. Based on the clinical examination and TCVM principles, the lung (metal element) appeared to be the major *Zang-Fu* organ involved. Chronic coughing indicated a failure of Lung *Qi* to perform its normal ascending-descending function. The weak pulse on the left side and dry cough indicated *Yin* deficiency. The thick tongue indicated retention of body fluid in the tongue due to long term *Qi* deficiency. Purple tongue can be caused by weakness of Lung (metal) *Qi* that fails to control Liver (wood) *Qi*. As a result Liver *Qi* became dominant and stagnated. All of the clinical findings along with the weakness of the left pulse indicated Lung *Qi* and *Yin* deficiency. The normal descending function of the Lung requires the Kidney to grasp the Lung *Qi*. Weakness of both Lung *Qi* and Kidney *Qi* lead to failure of the lung to perform its normal descending function and can eventually lead to clinical signs of coughing and RAO. Since both the lung and kidney were involved, the TCVM diagnosis was Lung/Kidney *Qi* and *Yin* deficiency. *Yin* deficiency generates a false heat in the body and can cause warm ears and warm body surface. The treatment strategy for Lung/Kidney *Qi* and *Yin* deficiency includes tonifying both the Kidney/Lung *Qi* and *Yin* and treating the symptoms of heaves.

Acupuncture treatment was initiated using dry needles at *Bai-hui*, BL-26, and BL-23 for general *Qi* tonification and Kidney *Qi* tonification. Electroacupuncture was performed at CV-17, CV-22, LU-1, *Ding-chuan*, BL-13, *Fei-men*, GV-14, *Fei-pan*, and *Fei-shu* to stop coughing, relieve the other clinical signs of RAO and tonify the Lung *Qi*. GV-14 was used to balance the immune system. An electronic acupunctoscope (model WQ-6F Dong-Hua electronic company, Beijing, China) was used for the electroacupuncture treatment. Electrical stimulation was applied at a low frequency of 20 Hz for 10 minutes followed by a high frequency dense-disperse pulse at 80-120Hz for 10 minutes.

Chinese herbal therapy was begun using Breath Easer^a 15g PO BID (Table 1). The Breath Easer formulation was developed based on the classical formulation *Ge Jie San* from Yuan-heng's Therapeutic Treatise of Horses. It was prescribed to

tonify Lung and Kidney *Qi*, nourish Lung *Yin*, and stop cough and asthma. Lily Combination^a 15g PO BID was also prescribed (Table 2). The Lily Combination formulation was developed based on the classical formulation *Bai He Gu Jin Tang* (Lily bulb decoction). The ingredients of each herbal formula and their action are given in Tables 1 and 2.

Lily Combination was prescribed to nourish *Yin*, moisten the Lung, stop asthma, and stop cough.⁵ In the beginning of the treatment, continuation of an oral bronchodilator was recommended in order to alleviate a severe coughing.

The horse was evaluated 2 weeks later. The owner reported a decrease in cough frequency but little improvement in the other clinical signs. On auscultation of the lungs there were less crackles and wheezing. The TCVM evaluation was unchanged and acupuncture treatment was the same. The dosages of the Chinese herbal medications were increased to 30g BID orally for both herbs. The horse was scheduled for monthly reevaluation during the following six months.

A significant improvement in the clinical signs and general well being of the horse were reported by the owner by the first month after initiating treatment. The frequency of the cough had decreased but the horse still exhibited signs of dyspnea. The horse was treated with electroacupuncture using the same acupuncture points and technique as previously and the same herbal supplements were continued at the dosage of 30g BID orally. At this time the oral bronchodilator was discontinued.

A month later on the third visit, the owner reflected that the horse was doing much better in spite of a series of dry coughing episodes. On this visit the dyspnea and the heave line had disappeared. The respiratory rate was 25/ minute. It was also noted by the owner that there was a remarkable improvement of the recovery of the respiratory rate following exercise and improvement in the horse's attitude toward the other horses in the same stable. At the monthly intervals the acupuncture points used in each treatment varied some but the points common to all treatment sessions, were BL-13, *Fei-shu*, *Fei-men*, *Fei-pan*, CV-17, CV-22, *Ding-chuan*, and GV-14. With a daily supplement of Breath easer and Lily combination at a dosage of 30g BID orally and monthly electroacupuncture, the clinical signs of RAO were under control without corticosteroid and bronchodilator therapies.

According to TCVM, heaves can be a

manifestation of either an excess or deficiency pattern. An excess pattern of heaves is the result of invasion of wind or phlegm pathogens. This results in a failure of the Lung to perform its normal function to disperse and to descend *Qi* to the other *Zang-Fu* organs. A deficient Lung *Qi* pattern may originate from a deficiency in the Lung itself causing failure of the descending function or from over-work or over-exercise which leads to Kidney *Qi* deficiency. Chronic Kidney *Qi* deficiency can result in the failure to receive the *Qi* descended by the Lung and can consume Lung *Qi*.⁶

In another case report RAO horses benefited from a single acupuncture treatment based on temporal improvement in maximal change in pleural pressure, pulmonary resistance, dynamic compliance, respiratory rate, and tidal volume.⁷

Acupuncture releases endogenous beta-endorphin in the central nervous system.⁸ Beta-endorphin can be released from immunocytes at the local tissue level during inflammation.⁸ The immunocytes also express opioid receptors on their cell surfaces.⁹ Endogenously released opioids not only possess analgesic properties but also reduce inflammation.¹⁰ Eisenstein demonstrated that in-vivo administration of morphine suppresses a variety of immune responses associated with NK-cells, T-cells, B-cells, macrophages, and polymorphonuclear cells.¹¹ Morphine also inhibits neutrophil chemotaxis induced by serum activated with E.coli and this inhibition can be antagonized by naloxone.¹² Therefore it is possible that endogenous opioid released after acupuncture suppresses the lung inflammation associated with equine RAO via these same mechanisms.

Several genes have been identified and

characterized as predisposing humans to asthma. The same type of investigation has not yet been undertaken in equine RAO. The ischemic monkey model revealed alteration of gene expression in central nervous tissue when treated with electroacupuncture resulting in protection from cerebral ischemia.¹³ Following electroacupuncture, major genes were up-regulated, including signal transduction, cell cycle metabolism, stress response, and DNA repair related genes. The up-regulation of genes following electroacupuncture may reduce predisposing factors in both human and equine asthma.

The clinical management of equine RAO requires identification of the offending antigen and avoidance or removal of the antigen from the environment but this may not be possible. Acupuncture and Chinese herbal therapy may provide an effective alternative or additional therapy for RAO in horses. The risk of complications associated with acupuncture and Chinese herbal medicine is suspected to be lower than current conventional treatments. Further investigation of the therapeutic efficacy of acupuncture and Chinese herbal therapy in a large population of horses is needed. Improvement of clinical signs as well as improvement of pulmonary function tests and BAL cytology should be documented. A well designed study would provide information to better understand how acupuncture can help to alleviate the clinical signs of equine RAO.

- a. Available from Jing Tang herbal;
www.tcvmherbal.com

Table 1: The ingredients of Lily combination and traditional Chinese medicine (TCM) action

Ingredient		TCM action
Pin yin name	English name	
<i>Bai He</i>	Lily bulb	Moisten the lung and stop cough ⁵ , and nourish lung <i>Yin</i> . ¹⁴
<i>Shu Di Huang</i>	Rehmannia	Nourish Kidney <i>Yin</i> and <i>Jing</i> . ^{5,14}
<i>Sheng Di Huang</i>	Raw Rehmannia	Cool Blood and nourish <i>Yin</i> . ^{5,14}
<i>Mai Men Dong</i>	Ophiopogon	Nourish <i>Yin</i> ⁵ , stop cough. ¹⁴
<i>Bai Shao Yao</i>	Paeonia	Nourish Liver <i>Yin</i> ⁵ , and tonify Blood and move liver <i>Qi</i> . ¹⁴
<i>Xuan Shen</i>	Scrophularia	Cool Blood and nourish <i>Yin</i> . ^{5,14}
<i>Zhe Bei Mu</i>	Fritillaria	Moisten the lung and stop cough ⁵ , open the Lung and resolve Phlegm. ¹⁴
<i>Dang Gui</i>	Angelica	Nourish Blood. ^{5, 14}
<i>Jie Geng</i>	Platycodon	Open the lung and stop cough. ^{5, 14}
<i>Gan Cao</i>	Licorice	Harmonize the formulas. ^{5, 14}

Table 2: The ingredients of Breath Easer and TCM action

Ingredient		TCM action
Pin yin name	English name	
<i>Ge Jie</i>	Gecko	Tonify Lung and Kidney, stop cough/ asthma. ^{5,14}
<i>Ren Shen</i>	Ginseng	Tonify primary <i>Qi</i> and Kidney <i>Qi</i> . ⁵
<i>Jie Geng</i>	Platycodon	Open the Lung and resolve Phlegm ⁵ , and guide the effect of others herbs to upper burner. ¹⁴
<i>Bai He</i>	Lily	Moisten the Lung ⁵ and stop cough. ¹⁴
<i>Di Long</i>	Earth worm	Stop asthma and cough. ^{5,14}
<i>Chuan Bei Mu</i>	Fritillaria	Resolve Phlegm and nourish Lung <i>Yin</i> . ^{5,14}
<i>Wu Wei Zi</i>	Schisandra	Tonify Lung and Kidney. ^{5,14}
<i>Mai Men Dong</i>	Opiopogon	Nourish <i>Yin</i> ⁵ , and stop cough ¹⁴ .
<i>Zhe Bei Mu</i>	Fritillaria	Resolve Phlegm and clear Lung heat ⁵ , and stop cough ¹⁴ .

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Recurrent airway obstruction (RAO) is a common, performance-limiting, allergic respiratory disease of horses characterized by chronic cough, nasal discharge, and respiratory difficulty. Episodes of airway obstruction are seen when susceptible horses are exposed to common allergens. Medical treatment consists of a combination of bronchodilating agents (to provide relief of airway obstruction) and corticosteroid preparations (to reduce pulmonary inflammation). Bronchodilator therapy (β_2 agonists and parasympatholytic agents) will provide immediate relief of airway obstruction until clinical signs of disease are controlled by corticosteroids. Diagnostic and medical management of Equine Asthma. The American College of Veterinary Internal Medicine Forum, Denver, CO. June 2016. Regional and State Complementary and alternative medicine. Competitive Equine Research Fellowship supported with Pari-Mutual Funds: The PVM Equine Research Fellowship is for the recruitment of outstanding M.S. or Ph.D. track students to conduct applied/clinical research in the area of equine medicine at Purdue University to address issues of importance to the health and performance of Indiana race horses and other equine athletes. Efficacy of Inhaled Levalbuterol Compared to Albuterol in Horses with Recurrent Airway Obstruction. J Vet Intern Med. 2016 Jul;30(4):1333-7. Chinese herbal medicine (CHM) and acupuncture have long been practiced for a history of over two thousand years, which are recognized to be the most effective and popular therapies based on holistic concepts and syndrome differentiation of the TCM system. Some previous reviews regarding CHM [7, 8] or acupuncture [9] alone have suggested that both CHM and acupuncture have a beneficial effect on IBS-D symptoms. Nonetheless, no systematic review or meta-analysis is available at present to assess the effect of acupuncture combined with CHM on treating IBS-D. In acupuncture, traditional Chinese physicians prefer to apply needles without using electroacupuncture apparatus.

Electroacupuncture (EA) was better in improving the AHI and apnea index when compared with control treatment, but no statistically significant differences in hypopnea index and mean SaO₂ were found. A combination of medical subject headings (MeSH) and free terms was applied to retrieve the potentially eligible studies as possible; MeSH was slightly modified based on the specification of each database. Additional Points. This review highlights the clinical effect of manual acupuncture and electroacupuncture in the treatment of patients with obstructive sleep apnea. Competing Interests. The authors declare that they have no competing interests regarding the publication of this paper.