

ORIGINAL ARTICLE

Electro-acupuncture in the dog: diagnostic evaluation points

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Summary

The aim of this study was to identify electro-acupuncture points in the dog and to evaluate diagnostic aspects of the application of electro-acupuncture in veterinary medicine. For this purpose, we used four crossbred dogs affected by different diseases and four healthy dogs. In all animals, the conductance was measured by using electro-acupuncture according to Voll, “EAV” GOLD. Measurement carried out in the four ill dogs showed conductance values higher (70 SU) or lower (30–40 SU) than that observed in healthy dogs (45–60 SU). Our results showed that the measurement of conductance in the acupoint along the Bladder meridian might be considered as a useful technique for the diagnosis of some diseases in dogs, in association with good clinical practice.

Key words: Electro-acupuncture – Meridian charts – veterinary practice – dog

INTRODUCTION

Acupuncture is one option among different treatments for pain in clinical veterinary practice. The advantages of acupuncture are that it is practical, safe, cheap, and with fewer side effects when compared with the conventional pharmaceutical management of pain. The disadvantages are that a specific knowledge of the

subject is necessary and that the response among individuals may vary (Cassu et al. 2008). It is generally accepted that acupuncture has been used in animals for as long as it has been practised in humans and that its origins and course of development are closely parallel to that of human acupuncture (Jaggard 1984).

In some studies conducted on both humans and dogs, acupuncture was found to be beneficial in cases where analgesics and anti-inflammatory medications were ineffective or showed side effects, and in cases where surgery was not recommended. Favourable acupuncture results have been reported in the treatment of many canine diseases: otitis (Sanchez-Araujo and Puchi 1997), cardiovascular disorders (Smith 1992), chronic respiratory conditions (Schwartz 1992), dermatological disorders (Waters 1992), gastrointestinal disorders (Dill 1992), gynaecological and reproductive disorders (Lin and

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Panzer 1992), immune-mediated disorders (Rogers et al. 1992), musculoskeletal disorders (Schoen 1994), neurological disorders (Joseph 1992), thoracolumbar and cervical disc disease (Durkes 1992, Janssens 1992, Hayashi et al. 2007) and the idiopathic Horner's syndrome (Cho and Kim 2008).

Oriental medicine teaches that each of the 12 Main Meridians (Lung, Large Intestine, Stomach, Spleen-Pancreas, Heart, Small Intestine, Bladder, Kidney, Pericardium, San Jiao, Gallbladder and Liver) connects with its specific internal organ. It also teaches that acupuncture at any point on a given Meridian influences both its related organ and pathways (superficial Meridian and its other internal pathways) (Limehouse and Taylor-Limehouse 2001). In modern physiology, segmental reflexes explain many of the therapeutic and diagnostic relationships between internal organs and their related acupuncture points; the same spinal nerves service both the area of the point and the area of the pathology. However, not all the therapeutic/diagnostic relationships can be explained by segmental reflex. It acts through stimulation of sensory nerves and autonomic nervous system, as well as via modulation of the release of hormonal factors, including endogenous opioids (Arraz et al. 2006).

In the early 1950s, Reinhold Voll, a German medical doctor, developed an electronic testing device for finding acupuncture points electrically. He was successful in finding acupuncture points and demonstrating that these points, known to Chinese acupuncturists for millennia, had a different resistance to a tiny electrical current passed through the body, than the adjacent tissues. The body is the emitting and receiving focus of electromagnetic messages. Cells, as well as the entire organism, constitute what is called in electronics an oscillatory circuit that is capable, if it is submitted to electromagnetic waves, to reach resonance with one of the waves, that is, the one that corresponds to the frequency of the circuit.

Ulett et al. 1998 showed that acupuncture produces an analgesic effect and that electro-acupuncture is more effective than manual acupuncture. Furthermore, electrical stimulation via skin patch is as effective as electro-acupuncture. In addition, electrical stimulation has been known to have the advantage of being less painful than manual stimulation (Han and Terenius 1982). Electroacupuncture is indicated for the treatment of chronic diseases, peripheral and central nervous system disturbances, and acute and chronic pain (Wynn et al. 2001).

Therefore, we evaluated the diagnostic aspects

of veterinary electro-acupuncture, applying the theories of Traditional Chinese Medicine (TCM) and using an electro-acupuncture system. We estimated the same electric features of cutaneous acupuncture points examined in dogs, such as resistance and conductance, compared with the same electric features of cutaneous neighbouring areas, to identify acupuncture points on the skin of four dogs affected by disorders.

MATERIALS AND METHODS

Subject

The study was performed in 4 crossbred male dogs which were affected by different disorders. The dogs were referred to the Faculty of Veterinary Medicine of Messina (Italy). The selection criterion for the animal disease cases studied was based on the high frequency of this pathology in our ambulatory practice.

Dog 1: the patient was a 1 year old, with a body weight of 13.5 kg, which underwent a surgery due to an intestinal perforation. Clinical examination showed a severe gastritis and hepatic insufficiency.

Dog 2: the patient was a 2 year old, with a body weight of 14.2 kg, affected by leishmaniasis infection characterized by skin lesions and a general visceral involvement, affecting various organs, such as, spleen, liver, bone marrow and lymph nodes.

Dog 3: the patient was a 11 year old, with a body weight of 13.0 kg, affected by cystic prostatic hyperplasia and renal insufficiency with parenchymal alterations of left kidney at the ultrasound exam.

Dog 4: the patient was a 7 year old, with a body weight of 15.0 kg, affected by irregular emesis and submitted to an antibiotic therapy for cystitis.

To avoid gender and age related differences, the control group was made up of 4 crossbred male dogs 5 years old, with a mean body weight of 15±2 kg. The experimental procedures were carried out according to the animal care standards recommended by the Guide for the Care and Use of Laboratory Animals and Directive 86/609 CEE (European Economic Community). The dogs were examined in the conscious state without sedation.

Procedures

Each dog was placed on an electrically isolated table and subjected to an accurate clinical investigation. Electro-acupuncture was then performed at the BL 18–23 (BL 18: back associated

point of Liver, BL 19: back associated point to Gallbladder, BL 20: back associated point to Spleen, BL 21: back associated point to Stomach, BL 22: back associated point to Triple heater, BL

23: back associated point to Kidney) along the “Bladder meridian”. At each acupoint, a three centimetres trichotomy was made (Figure 1). Then, on these points, which were dampened with ethyl



Fig.1. Illustration of the trichotomy area and acupoint used along the Bladder meridian



Fig. 2. Electro-acupuncture according to Voll (“EAV” GOLD)

alcohol, the conductance of the animal body through the skin by emitting a small nearly constant positive direct current (about $10\mu\text{A}$) from a thin metal probe was measured by using a non-invasive bioelectric medical system, planned for human

electro-acupuncture (Electro-acupuncture according to Voll, “EAV” GOLD, Bio Tekna, Biomedical Technologies, Italy) (Figure 2). The voltage drop on the patient was converted into an indication using an electronic amplifier circuit, which operates in

principle as a nonlinear amplifier. The system was provided with software and connected with a personal computer, and allowed the registration of all measurements obtained, control of the acupuncture point (the system could register pressures from 250 grams to 500 grams included) and an assessment of the quality of the measurement carried out. All measurements are expressed as Standard Units (SU).

RESULTS

Measurements carried out on the four ill dogs showed different conductance values on the various stimulated acupuncture points.

In Dog 1, measurements of conductance carried out on the acupuncture points corresponding to Stomach, Spleen, Liver and Gallbladder showed values lower than 35 SU; inferior to the human

Table 1. Conductibility values (expressed in SU) observed in the 4 ill dogs and in the control group in the acupoints considered along the Bladder Meridian

Dog	Kidney (BL 23)	Stomach (BL 21)	Spleen (BL 20)	Liver (BL 18)	Gallbladder (BL 19)
1	50 – 60	30 – 40	30 – 40	30 – 40	30 – 40
2	38 – 40	38 – 40	38 – 40	38 – 40	38 – 40
3	Dx 44 – 45 Sx 54 – 56	44 – 45	44 – 45	44 – 45	44 – 45
4	Kidney 60 Bladder 70	70	60	60	60
Control group					
1	45 – 60	45 – 60	45 – 60	45 – 60	45 – 60
2	45 – 60	45 – 60	45 – 60	45 – 60	45 – 60
3	45 – 60	45 – 60	45 – 60	45 – 60	45 – 60
4	50 – 60	50 – 60	50 – 60	50 – 60	50 – 60

physiological range, while the stimulation of the renal acupuncture point showed normal values of 50-60 SU. Dog 2 presented all conductance values lower than 45 SU. Dog 3 showed conductance values of 55 SU at the left kidney acupoint, while on the other point, conductance values were of 45 SU. In Dog 4 the stimulation of the acupuncture point corresponding to Stomach and Bladder showed conductance values lower than 60 SU, and on the other point conductance values were of 70 SU (Table 1).

The control group showed conductance values between 45 and 60 SU in all acupuncture point considered (Table 1).

DISCUSSION

In 1996, The American Veterinarian Medical Association (AVMA) recognized acupuncture as a valid veterinary alternative, and the World Health

Organization (WHO) considers acupuncture as an effective medical treatment. As a result, modern pet owners and veterinarians have rediscovered TCM as an adjunct to Western medicine. The goal of TCM is to diagnose imbalances in the life force (Qi), determine their causes (aetiology of the disease) and subsequently remove those causes from the patient's environment (treatment). TCM views disease as an imbalance between two polarities of Qi, yin (-) and yang (+). Within this conceptual framework, acupuncture is used to "communicate" with body organs and tissues through special channels or meridians. Health and healing in this context is the integration and restoration of balance or harmony of Qi. (Sheldon 1998).

Our results showed that the measurements of conductance carried out stimulating the specific acupuncture point along the Bladder meridian corresponding to Kidney, Spleen, Liver and Gallbladder may be considered as a useful technique in veterinary routine practice.

On the basis of electro-acupuncture according to Voll, the measured conductance is assumed to have correlation with the functioning of the organ associated with the meridian being probed. A reading of 50% of the full scale (achieved at 10 microSiemens conductance), with a tolerance from 50 to 65 SU, is assumed to correspond to the state of no dysfunction, a equilibrium between the stimulation current and the reaction of the organ. Higher ratings (bigger conductance values) are assumed to indicate a hyper-functioning organ or function, such as inflammation, as the result of a low resistance of the organ to let the current through. A lower reading (lower conductance values) should indicate a hypo-functioning organ or function, such as stagnation, as the result of an increase of the resistance of the organ to the flow of the current.

Conductance values obtained by stimulation of the studied acupoints in the experimental group had lower or higher values than that of the control group at the same acupoints.

The control group showed a minimum mean value of 46.25 ± 2.5 SU and a maximum mean value of 60.0 ± 0.0 SU.

Dog 1, affected by intestinal perforation, showed a decrease of the conductance in the Stomach, Spleen, Liver and Gallbladder acupoint, indicating an increase of the resistance of these organs to the flow of the current as consequence of gastrointestinal damage and surgery. Dog 2, affected by Leishmaniasis infection, showed a decrease of conductance in all acupoints studied

because of a general visceral involvement due to the infection. Dog 3, affected by cystic prostatic hyperplasia and renal insufficiency, changed Sx in left Kidney acupoint compared with the other acupoint, but within the range exhibited by the control group. This could depend on the inflammation of the kidney that causes a decrease in the resistance at the level of the pathological kidney, compared with the other part of body, to let the current through. Dog 4, affected by irregular vomiting and cystitis, showed an increase of conductance at the level of Bladder and Stomach acupoint due to inflammation of these organs.

Thus it is possible to claim that, as in humans, the physiological range of conductance is about 50 SU and that the inflammation process cause an increase in conductance values, while the degenerative process causes a decrease in conductance values, although the individual variability, as observed in Dog 3, have to be considered in the assessment of clinical cases.

Therefore, the Bladder Meridian acupoint considered in our study may be correlated with a possible diagnosis of disease of the internal organs associated with good clinician practice. However, further studies are needed to demonstrate the reflex link between skin and internal organs, and vice versa, as previously obtained in cows (Kothbauer 2008). Further studies with a greater number of animals with the same diseases are necessary to make future judgements about the energetic values and pathological findings, and to find the relationship between conductance changes and some concrete disorders or diseases.

In conclusion, the results of our study underline the applicability of electro-acupuncture system "EAV" GOLD as an effective diagnostic technique for some canine diseases. It may be considered practical, safe, cheap, reliable and convenient, and when combined with standard Western medical treatment may improve diagnostic and therapeutic management of some canine disorders.

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