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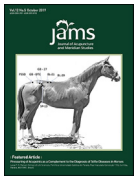

Research Paper

Canine and Feline Patients Referred Exclusively for Acupuncture and Herbs: A Two-Year Retrospective Analysis

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Abstract
Acupuncture and the administration of herbal supplements are increasingly used in veterinary practice, but no retrospective studies have examined patient characteristics and treatment interventions in a population of dogs and cats presenting exclusively for such therapies. This two-year retrospective analysis of 161 referrals to an integrative medicine service at an academic teaching hospital found that dogs were more frequently treated than cats (91.9% vs. 8.1%, respectively) and that small animal patients most frequently were presented for musculoskeletal (26.7%), neurologic (16.8%), oncologic (14.9%), and dermatologic (10.6%) conditions. Cats were older than treated dogs (12.7 ± 3.7 vs. 9.5 ± 4.3 years) and more likely to be treated for oncologic complaints (odds ratio = 5.6). Patients received acupuncture (95.4%), herbal supplements (76.4%), acupuncture with percutaneous electrical nerve stimulation (electroacupuncture, 26.1%), and/or cyanocobalamin injections in acupuncture points (pharmacopuncture, 23.6%). Some differences were detected between treatment groups. This retrospective analysis provides a foundation for designing future prospective studies using acupuncture and herbs in dogs and cats.

1. Introduction

An increasing number of veterinarians use veterinary acupuncture and herbal supplements in the treatment of a variety of conditions. These modalities are often considered in the broader discipline of integrative medicine, a concept of merging therapies from several disciplines,

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ideally with evidentiary support [1]. Surveys of veterinary colleges and suggested model curricular guidelines have suggested the need for greater research in this area [1,2], and no study has yet evaluated the presenting complaints, patient characteristics, and prescribed interventions in patients presented exclusively for acupuncture and herbal medicine. Our previous retrospective study [3] provided information on the aforementioned characteristics for a group of patients receiving a combination of integrative medical modalities such as rehabilitation, nutrition, photobiomodulation, acupuncture, and others. Therefore, the purpose of this retrospective analysis was to describe the features of this specific patient group receiving only acupuncture and/or herbal supplements. This information should provide greater insight for future investigations and targeted clinical studies.

2. Materials and Methods

The medical records of 161 canine and feline cases exclusively referred for acupuncture and/or herbal therapies were collected from an academic veterinary teaching hospital (VTH) over a two-year period from October 2013 to October 2015. Cases were presented by self-referral or by recommendation of a primary care veterinarian to the mixed animal integrative medicine service of the VTH. Patients were treated by one of the study authors (J.S. or H.X.). The following data were collected for each patient: age, species, the total number of visits during the study period, herbal prescriptions, primary and secondary presenting complaints, attending veterinarian, and the treatments elected, which included acupuncture, electroacupuncture (EAP), and/or pharmacopuncture (Vitamin B12 injections). Presenting complaints were categorized into one of the following groups: oncologic, musculoskeletal, neurologic, respiratory, gastrointestinal, urinary, dermatologic, ophthalmic, reproductive, behavioral, endocrine, or cardiovascular disorders.

Statistical analyses were performed between groups for continuous data, such as the number of visits and age, using the commercially available statistical software (Minitab 17.1). Data were first assessed for normality using the Ryan–Joiner test. Normal data were compared using a student *t*-test or one-way analysis of variance, and nonparametric data were compared using the Kruskal–Wallis test. Results were considered statistically significant if the probability of error was less than 5% ($p < 0.05$). Post hoc analysis was performed using the Fisher test for pairwise comparisons for analysis of variance and a Dunn's test for nonparametric data. Odds ratios (ORs) were calculated, using the commercial software (Microsoft Excel 2010), to assess comparisons between specific patient populations grouped by treated condition, the treatments elected, and specific herbal prescription. A result was considered statistically significant if the 95% confidence interval (CI) for the OR excluded the value 1.0.

3. Results

The VTH received 161 small animal patients exclusively for acupuncture and/or herbal supplementation during the study period. Dogs were more commonly treated than were cats (91.9% vs 8.1%). The mean age at the time of treatment was 9.7 ± 4.4 years, but cats were significantly older than dogs (12.7 ± 3.7 vs. 9.5 ± 4.3 years, $p = 0.01$). The mean number of visits during the study period was 4.1 ± 4.5 and did not statistically differ according to species, attending clinician, recommended herbs, condition, or treatments elected. A number of conditions were treated in dogs and cats (Figs. 1 and 2). Small animal patients most frequently presented for musculoskeletal (26.7%), neurologic (16.8%),

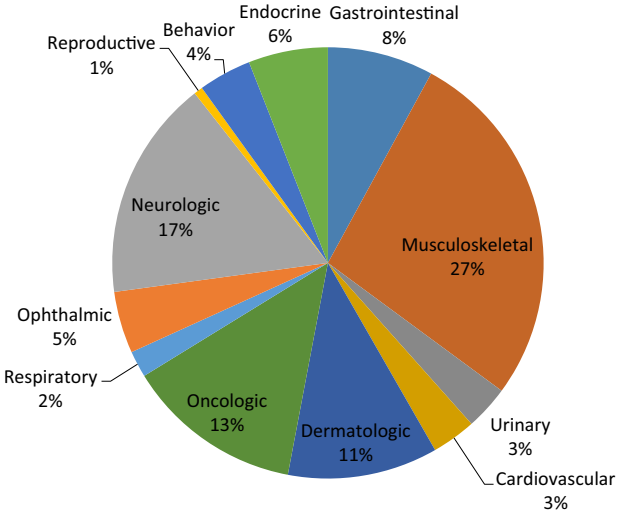

Figure 1 Distribution of presenting complaints in canine patients (n = 148) referred exclusively for acupuncture and herbs. The distribution is given as the percentage of each presenting complaint out of the total number of presenting complaints at the initial evaluation.

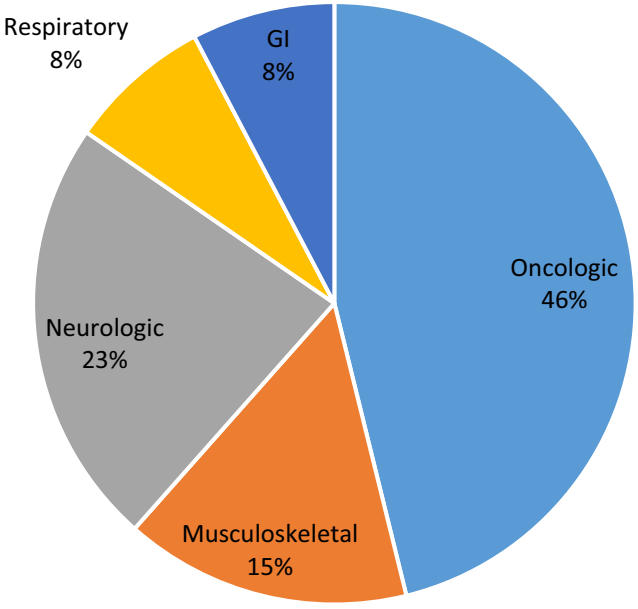

Figure 2 Distribution of presenting complaints in feline patients (n = 13) referred exclusively for acupuncture and herbs. The distribution is given as the percentage of each presenting complaint out of the total number of presenting complaints at the initial evaluation. GI = gastrointestinal.

oncologic (14.9%), and dermatologic (10.6%) conditions. Cats were more likely to be treated for oncologic complaints than were dogs (OR = 5.6, CI = 1.7-18.4, p = 0.004). The majority of the cases (82.6%) were treated by one study author (H.X.), and the remaining were attended to by another (J.S.).

The relative frequency of treatments elected from most to least common included acupuncture, herbal supplements, EAP, and pharmacopuncture (B12 injections) (Fig. 3). Dogs that received EAP were more likely to have a musculoskeletal condition than those that were not treated with this modality (OR = 3.5, CI = 1.6-7.5, p = 0.001). Canine patients administered pharmacopuncture (B12 injections) similarly had a greater likelihood of suffering from musculoskeletal pathology (OR = 2.2, CI = 1.02-4.7, p = 0.04). The dogs treated with herbal supplements were less likely to be treated with EAP than were those not receiving herbs (OR = 0.28, CI = 0.13-0.64, p = 0.002). No other statistically significant differences were identified between groups of treatments.

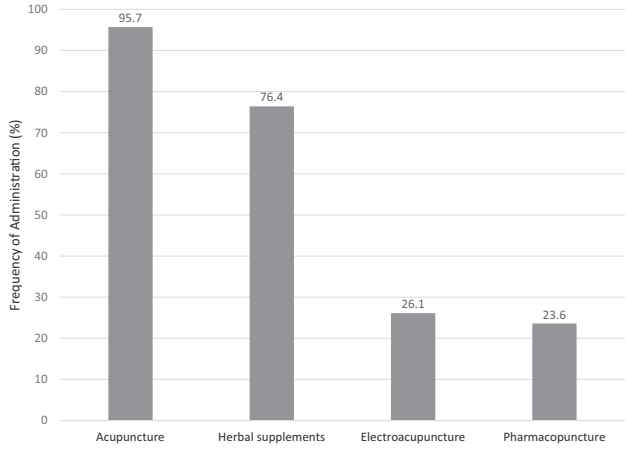

Figure 3 Frequency of administration of various treatment modalities in small animal patients (n = 161) presenting for acupuncture and/or herbs. The frequency of administration was calculated by the number of times a modality was administered out of the total treatment sessions for all patients.

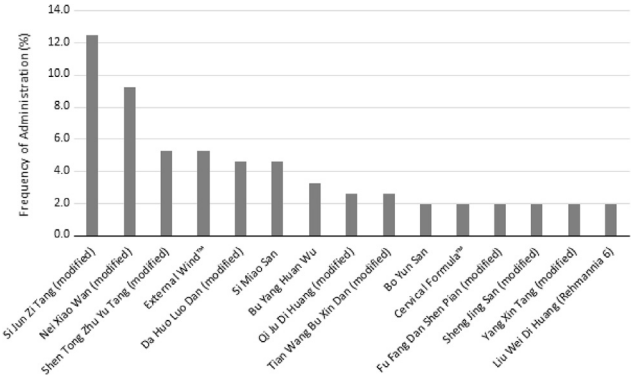

Figure 4 Commonly recommended traditional Chinese herbal formulas in canine and feline patients receiving herbal supplements (n = 123). The vertical columns represent the frequency of administration for each herb out of the total number of herbal recommendations (n = 152).

A number of traditional Chinese herbal formulas were recommended to clients (n = 58), and animals that received herbs were significantly younger than those who did not (8.9 ± 4.5 vs. 11 ± 3.4 years, p = 0.01). One clinician (H.X.) was significantly more likely to administer herbs during the study period (OR = 36.3, CI = 10.9-120.8, p = 0.0001). The four most common products were selected for comparison of patient characteristics (Fig. 4). Cats were more likely than dogs to receive two products: Si Jun Zi Tang (OR = 4.3, CI = 1.3-14.7, p = 0.02) and Nei Xiao Wan (OR = 6.1, CI = 1.8-21.2, p = 0.004). Dogs prescribed one formula for dermatologic disease, External Wind, were younger than dogs administered any of the other top three formulas (5.4 ± 3.4 vs. 11.3 ± 3.4, p < 0.001). Other differences were noted for groups receiving one herbal formula as opposed to another (Table 1).

4. Discussion

The results herein cannot be separated from the clinical context of the service to which the patients presented. The integrative medicine service from which these data were derived provides broad integrative care in a VTH with inpatient, outpatient, self-referral, and veterinarian-referral appointments. The majority of patients in this service received a combination of modalities, described in a previous investigation [3]. Therefore, these cases represent only about 9% of the entire service caseload [3]. The type of referral was not specifically evaluated, but most cases were referred based on owner request. Many owners maintained an interest in an approach centered on acupuncture and herbal medicine, which is often viewed broadly by some practitioners as Traditional Chinese Veterinary Medicine (TCVM). The reasons for this were not addressed by the study design, but our hypotheses include that patients were refractory to side effects of conventional therapies or that their owners viewed integrative therapies as safer. In addition, a previous survey of primary care clients at the study site identified a strong interest in these modalities [4].

Clinicians attended to dogs far more frequently than cats, and this reflects the overall hospital trends of a higher canine caseload. The reasons for this trend are beyond the scope of this investigation but are consistent across the profession [5]. Comparison of canine versus feline data may not be valid, given the small number of cats and given that cats were slightly older than dogs. The latter could be due to the comparative longevity of cats or because feline patients more commonly presented with oncologic issues. These retrospective data are unable to determine causality, so the links between feline age and presenting complaint should only be regarded as an observed association.

The two most common conditions treated, musculoskeletal and neurologic disease, were consistent with those previously determined in the study of animals receiving mixed modalities at the same VTH [3]. However, the present study identified 44% of the patients with these disorders, whereas all had one or the other when receiving multiple modalities [3]. Together, these data suggest that acupuncture and herbal supplements were administered for

Table 1 The odds ratio, 95% confidence interval (CI), and p-value for specific treatment factors in canine and feline patients grouped by herbal prescription.

Herbal product	Comparison herbal product	Factor	Odds ratio	95% CI	*p* value
Shen Tong Zhu Yu Tang	Si Jun Zi Tang (modified)	Pharmacopuncture	19.8	2.7-145.7	0.003
Shen Tong Zhu Yu Tang	Nei Xiao Wan (modified)	Pharmacopuncture	15.2	2.0-113.3	0.008
Shen Tong Zhu Yu Tang	External Wind™	Pharmacopuncture	25.7	2.2-298.5	0.01
Shen Tong Zhu Yu Tang	External Wind™	Musculoskeletal complaint	20.2	1.05-393.6	0.047
External Wind™	Shen Tong Zhu Yu Tang	Dermatologic complaint	88.2	3.8-2067.8	0.005
External Wind™	Nei Xiao Wan (modified)	Dermatologic complaint	130.2	5.7-2996	0.002
External Wind™	Si Jun Zi Tang (modified)	Dermatologic complaint	163.8	7.2-3738	0.001
Nei Xiao Wan (modified)	Shen Tong Zhu Yu Tang	Oncologic complaint	30.7	1.5-621.1	0.03
Nei Xiao Wan (modified)	External Wind™	Oncologic complaint	36.5	1.8-732.2	0.02
Si Jun Zi Tang (modified)	Shen Tong Zhu Yu Tang	Oncologic complaint	22.6	1.2-436.4	0.04

a broader range of conditions. The number of visits received for these two groups were different, with a mean of 4 in the present investigation, nearly double that in the other [3]. In both cases, however, the standard deviation was extremely large and therefore likely influenced by the animal guardian, patient, and condition.

Many TCVM practicing veterinarians recommend acupuncture as a useful adjunctive modality in musculoskeletal diseases associated with pain, and more specifically osteoarthritis. The analgesic mechanism of acupuncture remains controversial and is the subject of continued investigations [6—9]. Some clinical studies in dogs showed no dramatic effect on markers of limb function, for example, whereas others demonstrated adjunctive effects on models of acute pain [10—13]. The proposed mechanisms of acupuncture include endogenous opioid release, modulation of substance P, alterations in biochemical feedback, myofascial stimulation, and central cortical changes [6—8]. Several studies of varying methodological quality have identified improvements in patients with intervertebral disc disease with acupuncture [14,15]. The role of acupuncture in the treatment of other conditions, such as oncologic and dermatologic conditions, is unclear. An antiemetic effect of an acupoint has been documented in dogs, and nonspecific effects on appetite, possibly mediated by opioids, have been suggested and could be theorized to be beneficial in animals with cancer [16,17]. Dermatologic conditions, especially chronic atopy and others, are often frustrating to treat and for the owner to manage, and therefore, acupuncture may be viewed as an additional treatment option. No studies have evaluated the efficacy of acupuncture in these dermatological conditions in dogs or in cats.

Veterinary acupuncture involves the placement of fine-gauge, sterile, and one-time-use needles with only manual stimulation. However, EAP and pharmacopuncture are both modifications performed in some patients as noted previously. These were more prevalent in patients with musculoskeletal disorders. EAP may cause a frequency-dependent release of endogenous opioids [6], and chronic pain remains a feature of many musculoskeletal disorders. The injection of cyanocobalamin solution is a modern practice, also identified to be more common in the musculoskeletal group, but is without clear scientific rationale. Vitamin B12 may treat subclinical deficiencies [18,19], but practitioners believe it or a solution preservative stimulates the acupoint in a different manner than needle acupuncture, resulting in longer or additive stimulation. This intervention warrants additional study.

The administration of herbal medicines occurred in most patients. The study identified that herbal recommendations were provided to animals that were younger than those who did not receive such advice. This could be due concern for side effects in older animals, the types of conditions being treated, or concerns about herb—drug interactions. Additional study is needed to elucidate the reason for this trend. Herbal administration was less common in those animals that received EAP, and this may be because conventional drugs are often used in the management of musculoskeletal or neurologic pain, for which EAP may be used, than perhaps other internal medicine conditions, for which pharmaceutical interventions may be limited or ineffective.

A diversity of herbal recommendations was provided to owners, and most of these reflected the Chinese ethnobotanical traditions of combining multiple herbs in a formula believed to have medicinal qualities. A discussion of all the formulas is beyond the scope of this investigation. However, the four primarily prescribed herbs are traditionally administered to humans for gastrointestinal and/or immune support, neoplasia, musculoskeletal pain, and pruritus [20]. The conditions for which they were prescribed in these small animal patients largely matched these traditional uses. As with many herbal formulations, the combination of herbs is less well studied than the actions of single herbs. For example, astragalus, found within Si Jun Zi Tang, may have immunomodulatory effects which improve outcomes in people with certain cancers [21]. Zedoary, a rhizome related to turmeric containing curcuminoids, may be antineoplastic and is found in Nei Xiao Wan [22]. Myrrh and angelica are possible antiinflammatory herbs in Shen Tong Zhu Yu Tang [23,24], and the peony present in the External Wind™ has been used in a different combination of herbs which may reduce allergic symptoms in dogs [25]. Most of these data are derived from experimental models using high doses of herbs, and so the clinical applicability of such research remains in question. Randomized controlled clinical trials are needed for many of these products in animals to fully evaluate their safety and utility.

The administration of herbal supplements, especially when done according to traditional medical principles or

healing systems, is subject to significant controversy. Rigorous scientific investigation of the most dietary supplements used in animals has not been performed, and many escape clear regulatory oversight. Most practitioners consider the side effects of such interventions minimal, but trace amounts of potentially toxic compounds, such as strychnine, have been identified in veterinary formulae and elevations in both hepatic enzymes and gastrointestinal symptoms have also been reported [26,27]. Experiential safety testing occurred in humans over long historical periods, but this is not true for small animals and is also subject to inaccuracies and confirmation bias [28,29]. Ethnopharmacological investigations are ongoing, but this is a slow and expensive process; practitioners often weigh clinical experience and judgement in the absence of complete pharmacologic data. In traditional Chinese medical approaches, the distinction between herb and food is not clear, and some herbs such as ginger may serve both purposes and be regarded as safe [29,30]. The supplements identified in this retrospective investigation were primarily plant-derived, but some contain animal ingredients. Therefore, the term "herb" must be considered broadly, which is consistent with the terminology used in the traditional medical system from which these agents are derived.

Acupuncture and herbal medicines have received criticism for relying on a practice of dogma and unproven traditional foundations [31,32]. However, this presumes that the practitioner relies only on traditional approaches. Patients in this study received a complement of conventional recommendations as well as integrative options according to the clinician's assessment. This deserves further study in light of the ongoing discussions about evidence-based medicine in veterinary practice [1,33,34].

Two different veterinarians attended to the study patients, which complicates the study. However, a single author attended to most cases (H.X.). No differences in the conditions treated between doctors were detected, but this veterinarian treated cases with herbal supplements far more often than the other. This may be explained by the clinician's extensive training and experience in this modality or because he also is affiliated with an herbal manufacturer. However, patients did receive informed consent regarding the multiple vendors from which supplements could be purchased, and herbal products were not filled by the VTH. Most herbal products are available from multiple suppliers, although quality and standardization may vary [26,35].

This study characterizes defining features of dogs and cats treated exclusively with acupuncture and/or herbal medications in a VTH and establishes a foundation for future research to define best practices. The data suggest that prospective studies in cats with neoplasia and in dogs with musculoskeletal, neurologic, and dermatologic conditions should be performed. The most frequently prescribed herbal combinations also represent targets for future research. The diversity of conditions treated with these modalities was noteworthy and should be considered in future assessments. These critical areas must be explored to refine the best evidence-based practices in this subset of integrative medicine.

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