Perceptions and priorities of owners of dogs with heart disease regarding quality versus quantity of life for their pets

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Objective—To describe the relative importance of pets' quality versus quantity of life among owners of dogs with heart disease.

Design—Prospective questionnaire-based clinical study.

Sample Population—Owners of 201 dogs with heart disease.

Procedures—Owners each completed a questionnaire that was designed to ascertain the relative importance of quality versus quantity of life for their pet and to assess the owners' willingness to trade survival time for quality of life, if that were possible. Analyses were performed to evaluate factors associated with owner willingness to trade time for quality of life.

Results—Most owners (170/197 [86%]) were willing to trade survival time for quality of life for their heart disease–affected dogs; of those owners, 88 (52%) were willing to trade 6 months. Owners were highly concerned with detection of perceived pet suffering and their pet's ability to interact with them. Owners whose pets had respiratory difficulty or fainting episodes and were treated on an outpatient basis had a greater willingness to trade survival time than owners of dogs that were treated on an emergency basis. Among owners willing to trade time for quality of life, younger owners and those whose pets had fainting episodes were willing to trade the most amount of time.

Conclusions and Clinical Relevance—Results indicated that quality of life is highly important to owners of dogs with heart disease. Owners' priorities partly depend on owner age and the pet's clinical circumstances; ongoing client-veterinarian communication is important to optimize treatment success as perceived by owners. (*J Am Vet Med Assoc* 2008;233:104–108)

The veterinarian's oath commits veterinarians to "the relief of animal suffering."[1] Suffering is defined as the tolerance or endurance of evil, injury, pain, or death.[2] Thus, it would appear that veterinarians are dedicated to improve the quality (ie, alleviating injury and pain) as well as the quantity (ie, preventing death) of their patients' lives. This dual mission is deeply ingrained into everyday veterinary practice, and it is tempting to assume that these goals are equally important to all veterinarians and pet owners. In ideal circumstances, each veterinary treatment would ensure high quality of life and increase longevity; however, in many instances, treatment may fail to achieve one or even both of these goals.

Abbreviations

CI	Confidence interval
ISACHC	International Small Animal Cardiac Health Council

Dogs with advanced heart disease are perceived to have a reduced quality of life because of respiratory distress, poor appetite, and reduced activity.[3] Most causes of heart disease in dogs, such as mitral valve disease and cardiomyopathy, are progressive and reduce the life span of severely affected patients. When dealing with heart disease–affected dogs, veterinarians commonly prescribe medications that diminish clinical signs and improve survival time (eg, diuretics, angiotensin-converting enzyme inhibitors, and pimobendan). Yet, among dogs receiving such standard treatments, there is a wide degree of variation with respect to adverse effects, development of refractory clinical signs, and financial burden to the owner as well as in the level of owner's comfort with administration of medications of a more expensive or experimental nature. Thus, specific decisions regarding the management of heart disease cannot always or equally fulfill the dual mission of the

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veterinarian's oath. Veterinary medicine is unique in that the regulations that govern pharmaceutical use are less restrictive than those in effect in human medicine.[4] This allows veterinarians more flexibility in dealing with issues of longevity versus quality of life, yet at the same time, little is known about the relative values of quality and quantity of life as perceived by pet owners whose dogs have heart disease. A greater understanding of these issues would help clinicians and owners align themselves toward shared goals, thereby better serving both the client and patient. The purpose of the study reported here was to describe the relative importance of pets' quality versus quantity of life among owners of dogs with heart disease. To this end, we sought to prospectively determine owners' perceptions and priorities regarding the quality and duration of their pet's life through a multicenter questionnaire-based clinical study.

Materials and Methods

Owner participation—The study was designed as a prospective multicenter investigation involving owners of dogs for which a diagnosis of heart disease had been made. Owners were eligible for inclusion if cardiovascular disease was identified in their dog during a visit to the cardiology services of the University of Pennsylvania, Tufts University, Ontario Veterinary College, Veterinary Emergency Clinic (Toronto), and The Animal Medical Center (New York). Owners were excluded if they did not speak or read English. Informed consent was obtained from each study participant indicating that their responses would not be used by the veterinarian to make medical decisions regarding their pet and that their identity would not appear in any publication or report produced from this study. In instances where 2 or more owners were present during the visit, the owners were allowed to confer during completion of 1 questionnaire/dog. The timing of when owners were asked to participate during the course of their visit was not standardized. Study participants were provided a written questionnaire by the veterinarian or by someone from his or her staff (typically a technician or veterinary student). The questionnaire asked 3 questions about the participant's perception of the importance of appetite, exercise ability, and interaction with the owner in the pet's quality of life. These characteristics were selected on the basis of the assumption that pet owners perceive these as important for their dogs' well-being. These questions were answered by use of a 10-point rating scale that ranged from 1 (not important) to 10 (extremely important). The same owners were then asked to rate their level of concern regarding their inability to perceive whether their pet was suffering and their inability to know how long their pet was going to live. These questions were answered by use of a 10-point rating scale that ranged from 1 (no concern) to 10 (extreme concern). The same owners were then posed the following question: if medications could be given to maintain or improve their dog's quality of life but at the same time would reduce life expectancy, what would they consider to be the ideal balance between these 2 concerns? This question was answered by use of a 10-point rating scale that ranged from 1 (low quality of life but long life span) to 10 (high quality of life but short life span). The same owners were then asked if they would be willing to trade longevity for quality of life for their pet and, if so, how much survival time they would be willing to trade to achieve perfect quality of life in their dog with heart disease. In using the term perfect, we sought to represent a quality of life that owners would unequivocally perceive as high; thus, perfect was used instead of words such as good or acceptable to avoid any potential ambiguity. Owners responded either yes or no to the initial question, and if they answered in the affirmative, they then selected the answer to the second question from the following responses: 3 days, 7 days, 14 days, 21 days, 1 month, 2 months, 3 months, 4 months, 5 months, or 6 months. In addition to completing the questionnaire, respondents were asked to provide information regarding their age and gender, number of dogs currently owned, and whether or not they had previously owned a dog with heart disease. The study protocol was approved by the institutional animal use and care committees and institutional review boards, as required of each participating study site.

Dog information—For each dog, the primary attending veterinary cardiologist provided descriptive data, including type of evaluation (outpatient vs emergency), primary cardiac diagnosis, comorbid cardiac conditions (ie, atrial fibrillation, ventricular premature contractions, and pericardial effusion), ISACHC clinical class of heart disease,[5] clinical signs (ie, exercise intolerance, fainting, poor appetite, and respiratory difficulty), and the presence or absence of congestive heart failure determined on the basis of physical examination or radiographic findings.

Statistical analysis—Statistical analysis was performed by use of computer software.[a] Descriptive statistics were calculated. Continuous and ordinal data were expressed as median values and ranges; categoric data were expressed as frequencies. A Wilcoxon signed rank test was used to compare owner responses with rating scale questions, and a value of $P < 0.05$ (2-tailed) was considered significant. Logistic regression analyses were performed to evaluate factors associated with the owners' willingness to trade survival time for quality of life and, among those owners willing to trade, factors associated with the willingness to trade 6 months of time. Two-way interactions among the main effects were investigated. An interaction term was retained on the basis of a value of $P < 0.05$. Univariate analysis was performed initially, and factors with a Wald test value of $P < 0.20$ were tested in each multivariate model. A factor was retained in the model on the basis of a Wald test value of $P \leq 0.05$ or if it was found to be a confounder (changing model coefficients by > 15%).

Results

Study participants—Owners of 201 dogs participated in the study; 78 (39%) owners were recruited at the University of Pennsylvania, 53 (26%) owners were recruited at Veterinary Emergency Clinic, 34 (17%) owners were recruited at Tufts University, 30 (15%) owners were recruited at the University of Guelph, and

6 (3%) owners were recruited at the Animal Medical Center. Twelve clinicians were involved (3 to 53 patients each). Four of 201 (2%) dogs were examined on an emergency basis, and the remaining 197 (98%) were examined on an outpatient basis.

Owner and dog information—Among the 201 dogs, the primary diagnoses included acquired mitral valve disease (140 [70%]), cardiomyopathy (37 [18%]), congenital abnormalities (10 [5%]), primary arrhythmias (6 [3%]), and other conditions (8 [4%]). Fifty-two (26%) dogs had additional conditions, of which 8 had atrial fibrillation and 8 had ventricular premature contractions. On the basis of the ISACHC classification, 38 (19%) dogs were class 1a, 52 (26%) were class 1b, 83 (41%) were class 2, 26 (13%) were class 3a, and 2 (1%) were class 3b. A diagnosis of congestive heart failure had been made in 76 of the 201 (38%) dogs. The presence of clinical signs referable to cardiac disease was reported in 112 dogs; 62 (31%) dogs had 1 and 50 (25%) dogs had > 1 cardiac clinical sign. Fifty-one of 201 (25%) dogs had exercise intolerance, and 16 (8%) had episodes of fainting. Twenty-seven (13%) dogs had poor appetites, and 81 (40%) had respiratory difficulty. One hundred fourteen of the 201 (57%) dogs were from single-dog households, 58 (29%) were from a household with 2 dogs, and 29 (14%) were from a household with ≥ 3 dogs. Of the 201 owners, 187 provided their age and 196 provided their gender. Median age of the owners was 47 years (range, 19 to 80 years). One hundred thirty-seven of the 196 (70%) owners who responded to the gender question were female and 59 (30%) were male.

Quality-of-life issues—When owners considered their dog's quality of life, there was a significant difference among the median scores for importance of a good appetite (median, 9; range, 4 to 10), good exercise ability (median, 8; range, 2 to 10), and good interactions with the owner (median, 10; range, 3 to 10; $P < 0.001$; **Figure 1**). When owners rated their level of concern regarding their inability to subjectively assess whether their pet was suffering, the median score was 10 (range, 1 to 10); for owners' level of concern regarding their inability to know how long their pet was going to live, the median score was 8 (range, 1 to 10). Although both of these median scores would be considered high, the concern regarding inability to perceive suffering was significantly ($P < 0.001$) higher than the concern regarding life expectancy. When owners were asked to rate the ideal balance of quality of life with life span (with low quality of life but long life span represented by 0 and high quality of life but short life span represented by 10), the median score was 8 (range, 1 to 10; **Figure 2**). One hundred seventy-six of the 201 (88%) owners chose a score > 5. Four owners failed to specifically answer the final question of whether they would be willing to trade survival time for improved quality of life, and the remaining 197 responses were used for statistical analysis. One hundred seventy of 197 (87%) owners were willing to trade survival time to achieve perfect quality of life for their dog with heart disease. Of those 170 owners, 88 (52%) were willing to trade 6 months **(Figure 3)**.

Via univariate analysis, factors associated with a willingness to trade survival time for quality of life (ie, factors with a value of $P < 0.20$) included owners of older age ($P = 0.17$), evaluation of pet on an emergency versus outpatient basis ($P = 0.06$), the presence of other conditions such as pericardial effusion ($P = 0.18$), the presence of > 1 clinical sign ($P = 0.02$), episodes of fainting or respiratory difficulty ($P = 0.05$), and the presence of 3 or more dogs in the household ($P = 0.20$). Multivariate analysis revealed that only the presence of the clinical signs of fainting and respiratory difficulty and whether the dog was evaluated on an emergency basis or as an outpatient significantly affected the owners' willingness to trade survival time for quality of life. Controlling for the mode of evaluation (emergency vs outpatient basis), the odds of being willing to trade survival time for quality of life was 3.3 times as great for owners of dogs with the more dramatic clinical signs as for owners of outpatient dogs with no clinical signs (95% CI, 1.2 to 8.7; $P = 0.02$). Controlling for the presence and type of clinical signs, owners of dogs that were evaluated on an emergency basis service were 0.08 times less likely to be willing to trade survival time for quality of life, compared with the owners of dogs that were evaluated on an outpatient basis (95% CI, 0.01 to 0.65; $P = 0.02$).

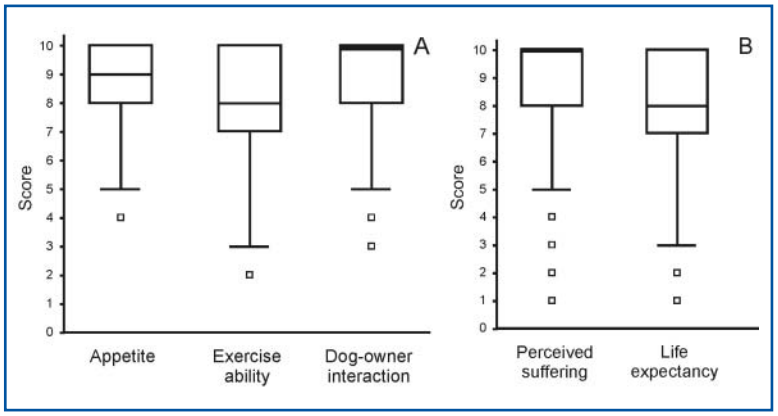

Figure 1—Box plots of the distribution of responses from 201 owners of heart disease–affected dogs when asked to indicate their perception of the importance of appetite, exercise level, and their dog's interaction on the pet's quality of life (A) and to rate how concerned they were regarding their inability to subjectively assess whether their pet was suffering and their inability to know how long their dog might live (B). Responses were given by use of a scale of 1 to 10; a score of 1 represented not important or no concern, and a score of 10 represented extremely important or extreme concern. Interaction was the most important quality-of-life characteristic, followed by appetite, and then exercise ($P < 0.001$); owners were more concerned about perceived suffering than longevity ($P < 0.001$). For each variable, the horizontal bar represents the median value and the box represents the interquartile range; values > 1.5 times the interquartile range (outliers) are indicated by small squares.

Among owners who were willing to trade survival time for quality of life, factors associated with willingness to trade 6 months of survival time (ie, factors with a value of $P < 0.20$ via univariate analysis) included owners of younger age ($P = 0.002$), ISACHC class ($P = 0.08$), episodes of pet fainting ($P = 0.01$), owner gender ($P = 0.18$), and single-dog household ($P = 0.06$). Multi-

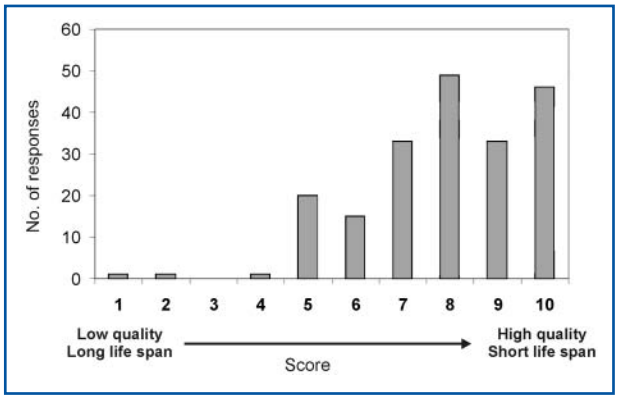

Figure 2—Distribution of the questionnaire responses from 201 owners of dogs with heart disease who were asked to select the ideal balance between their pet's quality of life and longevity. Responses were given by use of a scale of 1 to 10; a score of 1 represented the choice of low quality of life but long life span, and a score of 10 represented the choice of high quality of life but short life span.

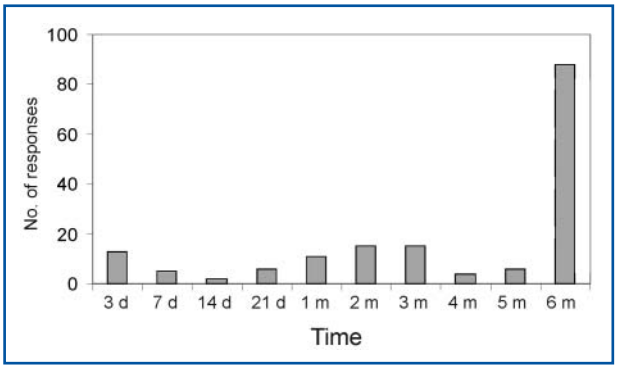

Figure 3—Distribution of the questionnaire responses from 170 owners of dogs with heart disease who indicated that they would be willing to trade their pet's survival time for improved quality of life and were then asked to select the amount of time they would be willing to trade (increments from 3 days [d] to 6 months [m]).

variate analysis revealed that only episodes of pet fainting and age of the owner significantly affected the owners' willingness to trade 6 months of survival time for perfect quality of life. Controlling for owners' age, the odds of being willing to trade 6 months of survival time was 3.0 times as great for owners of dogs that fainted as for owners whose dogs did not faint (95% CI, 1.5 to 5.9; $P = 0.001$). Controlling for episodes of pet fainting, owners that were ≥ 47 years old were 0.17 times less likely to be willing to trade 6 months of survival time, compared with owners that were < 47 years old (95% CI, 0.04 to 0.63; $P = 0.008$).

Discussion

The goal of the present study was to assess the relative importance of quality of life for owners of dogs with heart disease. To the authors' knowledge, this is the first investigation of such perceptions in this population. Among owners and veterinarians, the decision to trade survival time for improved quality of life is not merely an academic exercise, insofar as veterinarians possess the ability to prescribe drugs for nonapproved compassionate use and to perform euthanasia. Interestingly, quality of life is rarely used as an endpoint in veterinary studies; instruments to assess quality of life in dogs with heart disease have been developed only recently.[6] The study of this report revealed that successful treatment of heart disease in dogs must acknowledge owners' perceptions and priorities with regard to issues of quality of life.

In the present study, a time–trade-off paradigm was used to uncover owner priorities. This strategy is simple in that respondents are faced with only 2 dichotomous choices, and time–trade-off measurements are reliable and valid for use in attempts to gauge quality versus quantity-of-life issues,[7–11] including use in humans with heart disease.[12–14] In general, human patients are polarized to either extreme, that is, they definitely accept or reject a trade; however, as patients develop an increasing number of clinical signs, the willingness to trade increases.[14]

In our study of owners of heart disease–affected dogs, the relative importance of quality of life over quantity of life was apparent in owners' responses to each individual study question. The majority (86%) of respondents indicated in the affirmative when asked directly whether they would trade their pet's longevity for quality of life. This preference was also reflected in responses to other less direct questions. Respondents were significantly more concerned about potential suffering than longevity, and > 50% of respondents indicated the maximum level of concern when confronted with issues of perceived suffering. On consideration of the balance between longevity and quality of life, most owners (87.5%) indicated a preference for high quality of life but short life span for their pet (rather than low quality of life but long life span), and more than half of the owners indicated a willingness to trade 6 months of their dog's survival to preserve or restore a high quality of life. When asked to rate 3 different variables associated with quality of life, owners indicated that their pet's ability to interact with them was the most important. Results of previous studies[15,16] suggest that the bond developed between pet and owner is largely the result of shared experiences and time spent together; thus, our results suggest that once these experiences diminish, owners are likely to perceive a loss of quality of life for their pets as well as for themselves.

It is highly likely that owner perceptions and priorities change with time and circumstances. In the present study, owners sought veterinary care for their pets on an emergency or outpatient basis. Although few dogs were evaluated on an emergency basis, owners were significantly less likely to indicate willingness to trade survival time in this situation. On reflection, it seems reasonable that when faced with imminent and life-threatening circumstances, the primary reaction of owners is to want their pet to survive. In addition, the abrupt nature of the crisis may make it difficult for pet owners to accept the severity of their pet's disease or to provide sufficient time to process all of the information in an environment free from the emotion of the event. Conversely, owners whose dogs have clinical signs such as coughing, increased respiratory effort, or fainting are more willing to trade survival time, presumably to alleviate what they perceive as suffering or discomfort on the part of their

pet. Because owners' priorities may shift in relation to the situation, veterinarians should periodically reaffirm common treatment goals and expectations with owners, and longitudinal studies of owner perceptions of quality of life versus longevity are warranted.

Results of our study indicated that younger owners were more likely to trade large amounts of their pet's survival time for high quality of life. It is tempting to speculate that older owners, perhaps faced with a higher likelihood of loss of family and similar support systems, value time with their dogs more so than do younger owners. In human studies,[17–19] the effect of age on willingness to trade time is complex and confounded by comorbidities, economic and social statuses, ethnicity, religion, and many other complex attributes. Furthermore, direct comparisons between human and veterinary medical studies are difficult because owners are being asked to make decisions for their pet rather than for themselves, and differing attitudes are highly likely.

The present study has several limitations. The investigators were affiliated with large academic or referral institutions, and the study population is biased toward owners who were seeking secondary or tertiary care for their pets. Owners were asked to complete the questionnaires, having received varying degrees of information regarding the diagnosis and condition of their pet. For instance, owners sometimes completed the questionnaire prior to discussion of results from that particular hospital visit with the attending veterinarian. In other cases, owners completed the questionnaires in conjunction with input from friends or family members that accompanied them, resulting in a group opinion regarding the issues in question. We did not specifically ask the clinicians to render an opinion regarding their perception of the dog's quality of life, and the attending veterinarian's opinion could potentially bias owner responses had the owner completed the questionnaire after discussing their pet's condition with the clinician. Finally, the results of our study were limited to owners of dogs with heart disease and may not necessarily apply to owners of dogs with other disease conditions.

On the basis of findings of the present study, it is evident that owners of dogs with heart disease highly value their pet's quality of life. Veterinarians should discuss these quality of life issues with such owners to ensure that the care provided is directed toward the desired goals. Moreover, veterinarians should periodically reaffirm owners' priorities with regard to quality-of-life issues as their pets' clinical circumstances change. Clinical studies to evaluate efficacy of cardiac treatment in pet dogs should include aspects of quality of life as endpoints, and future studies should also seek methods to best measure these variables.

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