Validity of a health-related quality-of-life scale for dogs with signs of pain secondary to cancer

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Objective—To develop and validate a health-related quality-of-life scale for dogs with pain secondary to cancer.

Design—Questionnaire development.

Animals—40 healthy dogs with no history or signs of pain, 20 dogs with dermatologic disease but no signs of pain other than mild pruritus, and 20 dogs with cancer.

Procedure—Owners of all dogs completed a questionnaire containing 12 questions with 4 options for each question, and a quality-of-life score ranging from 0 to 36 was calculated. Scores for dogs with cancer were compared with scores for healthy dogs and dogs with dermatologic disease.

Results—All owners indicated that the questionnaire was easy to complete. Scores for healthy dogs were significantly different from scores for dogs with cancer and scores for dogs with dermatologic disease. Scores for dogs with dermatologic disease were significantly different from scores for dogs with cancer.

Conclusions and Clinical Relevance—Results suggested that a simple questionnaire may be useful in assessing health-related quality of life in dogs with pain secondary to cancer, in that dogs with cancer had significantly lower scores than did healthy dogs and dogs with dermatologic disease. (*J Am Vet Med Assoc* 2005;226:1354–1358)

Pain is a clinically important condition that results in suffering and adversely affects an animal's **quality of life (QOL)**.[1-3] During the past 2 decades, much emphasis has been given to the assessment of QOL in human medicine and a variety of methods for assessing QOL have been developed and validated in clinical trials.[4,5] Quality-of-life assessments have become useful tools in evaluating the effectiveness of treatment, whether palliative or therapeutic, and the US FDA has used information on health-related QOL in the approval of certain drugs.[6,7]

In human medicine, there is general recognition of the need to assess the impact of cancer and its treatment on the patient's QOL.[8,9] Quality-of-life assessments can be used to identify late problems associated with the disease and its treatment, and there is ample evidence that health-related QOL measures independently predict survival time in human patients with breast cancer,[10] melanoma,[11] lung cancer,[12] and other cancers.[13] Quality-of-life assessments may also contribute to the doctor-patient interaction in human oncology,[14,15] as standardized measurement of a patient's symptoms and ability to function offers an alternative method of collecting subjective information.[14]

The concept of QOL is also beginning to appear in veterinary medicine. However, criteria for measuring QOL in animals are rare. Mellanby et al[16] evaluated QOL in dogs undergoing palliative chemotherapy for lymphoma through the use of 5 questions, and McMillan[2] has proposed use of a short questionnaire to assess QOL in animals.

Quality of life can be assessed through the use of multi-item questionnaires that incorporate questions with yes-no responses or multiple options. Most QOL questionnaires incorporate at least 3 broad domains: physical, psychological, and social functioning.[13,17] Physical functioning involves symptoms associated with the disease itself and its treatment, as well as the ability to perform daily living activities.[13] Psychological functioning ranges from severe psychological distress to a positive sense of well-being and may also encompass cognitive functioning.[13] Social functioning refers to quantitative and qualitative aspects of social relationships, social interactions, and societal integrations.[13]

Assessing the QOL of neonates, infants, mentally disabled patients, and patients who are severely ill is difficult, as such individuals are incapable of providing first-hand information regarding their subjective experience.[18] As a result, researchers have devised instruments to acquire QOL information from other sources, such as parents, spouses, partners, caregivers, siblings, and health care providers. Such individuals are termed proxy informants.[18] Similarly, any assessment of the QOL of an animal must come indirectly from a proxy informant. For dogs, the best proxy informant is likely to be the person most familiar with the dog, which in most instances would be its owner.[19]

We believe that a QOL scale for dogs would be useful in assessing therapeutic success and prognosis. The purpose of the study reported here, therefore, was to assess the validity of a health-related QOL scale for dogs with pain secondary to cancer. To validate this scale, results obtained for dogs with cancer were compared with results for healthy dogs and dogs with dermatologic disease.

Materials and Methods

Dogs—Between April 2002 and May 2003, 80 adult (ie, > 12 months old) dogs distributed in 4 groups of 20 dogs each were enrolled in the study. Group 1 consisted of 20 healthy dogs that were owned by veterinarians and did not have any history or clinical signs of pain. Group 2 consisted of 20 healthy dogs that were owned by individuals who were

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not veterinarians and did not have any history or clinical signs of pain. Group 3 consisted of 20 dogs with dermatologic disease that did not have any signs of pain and no more than mild pruritus (ie, pruritus severity < 4 on a scale from 0 to 10). Group 4 consisted of 20 dogs with cancer in which the diagnosis had been confirmed on the basis of history, clinical signs, and results of diagnostic testing (eg, ultrasonography, radiography, and cytology) and that had signs of pain as assessed by their owners with a visual analogue scale. Group 4 dogs were not receiving any treatment at the time of the QOL assessment.

QOL questionnaire—The QOL questionnaire contained 12 questions with 4 possible responses for each question (**Appendix**). Responses for each question were scored from 0 to 3, and scores for all 12 questions were added to obtain the health-related QOL score. The highest possible score was 36, and the lowest possible score was 0, with lower scores indicating more problems or worse function. Questions solicited information about the emotional behavior of the dog (questions 1 through 4), physical state of the dog (questions 5 through 11), and the dog's interactions with its owner (question 12). Questions related to the physical state of the dog included evaluations of pain (question 5), appetite (question 6), fatigue (question 7), sleep problems (question 8), gastric problems (question 9), intestinal problems (question 10), and defecation and urination (question 11).

The individual closest to the dog (ie, the individual most familiar with the habits, behavior, and personality of the dog) was asked to complete the questionnaire. Sex, age, and educational level of the individual completing the questionnaire for each dog were recorded. Only those individuals who were able to read and write at a 12-year-old level were allowed to participate. The time it took for each individual to complete the questionnaire was recorded, and individuals completing the questionnaire were asked whether questions were easy or difficult to answer.

All owners who participated in the study provided informed consent prior to enrollment. The questionnaire was developed in Portuguese.

Pain evaluation—Owners of the dogs with cancer were asked to assign a score for severity of pain in their dogs through the use of a numerical rating scale[20] with 0 equivalent to no pain and 10 equivalent to the worst pain possible.

Statistical analyses—To verify questionnaire validity, analysis of covariance was used. Group, age, and sex of the dog and age and educational level of the owner were incorporated. To evaluate differences in the health-related QOL score among groups, ANOVA followed by the Bonferroni test was used.[21] Values of $P < 0.05$ were considered significant.

Results

Group 1 dogs (healthy dogs owned by veterinarians) consisted of 7 mixed-breed dogs, 2 Poodles, 2 Rottweilers, 2 Schnauzers, a Shih Tzu, a Basset Hound, a Labrador Retriever, a Cocker Spaniel, a Dachshund, a Chow Chow, and a Beagle. Group 2 dogs (healthy dogs owned by nonveterinarians) consisted of 6 Cocker Spaniels, 3 Poodles, 2 German Shepherd Dogs, 2 Rottweilers, 2 Labrador Retrievers, 2 mixed-breed dogs, a Pointer, a pit bull-type dog, and a Dachshund. Group 3 dogs (dogs with dermatologic disorders) consisted of 4 mixed-breed dogs, 4 Yorkshire Terriers, 3 Dachshunds, 2 Rottweilers, 2 German Shepherd Dogs, 2 Cocker Spaniels, a Poodle, a Saint Bernard, and a Bernese Mountain Dog. Group 4 dogs (dogs with cancer) consisted of 9 mixed-breed dogs, 4 Poodles, 2 Fox Terriers, a Rottweiler, a Cocker Spaniel, a Boxer, an Alaskan Malamute, and an Akita. Group 4 dogs (mean ± SD age, 138.8 ± 50.8 months) were significantly ($P = 0.02$) older than group 1 (60.6 ± 46.2 months), group 2 (60.1 ± 38.9 months), and group 3 (56.4 ± 39.3 months) dogs. Group 3 dogs were examined because of pyoderma (5 dogs), dermatophytosis (3), demodicosis (2), flea-bite hypersensitivity (2), scabies (1), fungal otitis (1), ear margin dermatosis (1), atopy (1), intertrigo (1), seborrhea oleosa (1), ceruminal otitis (1), and pododermatitis (1). Group 4 dogs were examined because of bone tumors (5 dogs), mammary gland tumors (5), skin tumors (4), hepatic tumors (2), an intestinal tumor (1), an ocular tumor (1), a lung tumor (1), and a brain tumor (1).

Mean ± SD health-related QOL score for group 1 dogs (34.0 ± 1.8; range, 30 to 36) was not significantly ($P = 0.734$) different from the score for group 2 dogs (33.8 ± 2.6; range, 27 to 36). However, mean score for group 3 dogs (30.6 ± 2.0; range, 27 to 34) was significantly lower than the score for group 1 ($P < 0.001$) and the score for group 2 dogs ($P = 0.004$), and mean score for group 4 dogs (20.7 ± 5.0; range, 12 to 29) was significantly lower than scores for the 3 other groups ($P < 0.001$ for all 3 comparisons).

An association between age and health-related QOL score was observed only for dogs in group 4. In that group, older dogs had lower QOL scores.

Sex, age, and educational level of the owner were not significantly associated with the health-related QOL score. All owners indicated that the questionnaire was easy to answer. Mean ± SD time to complete the questionnaire was 108 ± 50.1 seconds. Mean ± SD pain score assigned by owners of the dogs with cancer was 5.9 ± 2.0.

Discussion

Results suggested that a simple questionnaire may be useful in assessing health-related QOL in dogs with pain secondary to cancer, in that dogs with cancer had significantly lower scores than did healthy dogs and dogs with dermatologic disease. The difference in scores between dogs with cancer and healthy dogs was considerable, stressing the difference in QOL between these groups. In addition, although the mean score for dogs with dermatologic disease was significantly lower than the mean score for healthy dogs, the difference was small, demonstrating the sensitivity of the scale.

In the present study, mean QOL scores for healthy dogs owned by veterinarians were not significantly different from mean scores for healthy dogs owned by nonveterinarians, which suggests that medical training did not interfere with scores obtained with the present questionnaire. Although some studies in human medicine do not compare QOL of sick patients with that of healthy subjects or even QOL of inpatients with that of outpatients, we think that comparison of QOL scores among individuals with different health statuses is necessary to validate the scale. Previous authors[14,22,23] have also used various populations to validate a QOL questionnaire.

Questions included in the questionnaire used in the present study were based on questions incorporat-

ed in a questionnaire used to assess QOL in human patients with cancer.[23] To validate the scale, we examined 2 criteria—acceptability (ie, acceptable to the study population) and practicality (ie, easy to complete)—proposed by previous authors.[24] All owners in the present study agreed to answer the questions (acceptability) and stated that the questionnaire was easy to answer (practicality). Moreover, the time spent to complete the questionnaire was short.

In human beings, cancer pain significantly interferes with many aspects of daily life, altering QOL.[4-6] Our findings reflect this and show that dogs with pain secondary to cancer often have important changes in emotional behavior, physical status, and their relationship with their owner that can be demonstrated with a health-related QOL scale.

Although the term QOL has been used in many veterinary studies, criteria for defining QOL are rarely provided for animals.[18] In the authors' opinion, a questionnaire that can be used to standardize the evaluation of dogs with pain secondary to cancer may be useful for veterinarians since it will help to detect changes during treatment of chronic disease, facilitate the owner-veterinarian interaction, and increase the chance that adverse effects associated with treatment will be identified. Another reason to standardize the evaluation is that generally there is a large variation in the way the medical record is completed, which can compromise patient evaluation.[25] Indeed, Stromgren et al[25] demonstrated that with inaccurate medical records, many errors regarding patient evaluation will certainly happen with serious consequences for treatment and follow-up since important information will be forgotten. This aspect can be even more devastating for veterinary patients because they cannot communicate. On the other hand, if the clinician has a questionnaire with all essential aspects available, less information will be disregarded and the patient will be better evaluated.

In veterinary medicine, few studies[2,16,26] have used QOL assessments. We think that general questions such as "How do you rate your pet's QOL during treatment?" are quite subjective and will be unlikely to help in the recognition of the true condition of the animal. In a previous study,[16] owners answered by telephone 3 general questions regarding the QOL of their dogs after treatment for lymphoma. The study was retrospective and carried out by telephone, and cases were identified from the oncology database of the hospital. The authors stated that the QOL assessment was subjective and that a more sensitive assessment of the patient's QOL that was taken prospectively before and during treatment would be desirable for future studies.

In the present study, questions were directed to evaluate the daily activities, behavior, and physical state of the dog, which reflected QOL measures used in human medicine. Aspects such as appetite, sleep habits, fatigue, hygienic habits, pleasures (ie, playing and going for a walk), temperament, attitude toward owner, intestinal function, and signs of pain were considered. Because the objective of a health-related QOL instrument is to evaluate the impact of a specific health disorder on the major aspects of the patient's life, the questions used in human medicine involve the 3 broad domains of physical, psychological, and social functioning.[13] In the present study, we selected aspects from these 3 domains, although we chose those that could be substantially altered in dogs with cancer. McMillan[2] has suggested that the major contributing factors to QOL in animals include social relationships, mental stimulation, health, food consumption, stress, and control, and variables of concern for dogs were considered in the present study.

An important limitation of the present study is that the influences individual factors in the questionnaire have on QOL in dogs are not well understood at this time, and their inclusion and scoring criteria were extrapolated from data obtained from research in the area of human psychology and QOL. One point that can be discussed is that for certain types of diseases, some aspects included in the questionnaire would have a more pronounced impact on the health-related QOL score. This issue could be attenuated by giving different values to the specific questions. For instance, in a dog with chronic renal failure, vomiting could be more relevant than tiring easily. Many possibilities can arise from this discussion, and further studies evaluating the particularities of each disease are necessary.

One important point to be pondered is the type of relationship between a dog and its owner, as a true knowledge of all of the dog's activities during the day is necessary for questionnaire answers to be reliable. The same issue is described for the evaluation of pediatric patients and other patients for whom proxy informants are necessary for determining QOL. Importantly, proxy informants tend to underestimate a patient's health-related QOL, in that they generally report more problems and lower levels of functioning than patients themselves do.[13] Although the fact that evaluations must be made by the owners can be a limitation of QOL questionnaires in veterinary medicine, the evaluations provided by owners are not exclusively related to objective clinical signs but also include an evaluation of the subjective component of QOL.

Quality-of-life questionnaires are subjective but can offer more precise information than asking the patient to rate QOL on a scale from 0 to 10, with 0 representing very poor and 10 representing excellent.[16] According to Sprangers,[13] the subjectivity of health-related QOL assessments will help clinicians gain insight into the patient's perspective of the disease and treatment.

For human cancer patients, issues surrounding QOL are recognized to be central to good patient care.[14] A standardized measurement of a patient's signs and ability to function offers an alternative, structured way of collecting subjective information. Taking into account that animals cannot express their feelings, use of standardized questions seems to us quite reasonable.

The evaluation of pain in animals is a challenge for veterinarians. Behavior changes often associated with pain include alterations in personality and attitude; changes in appetite, appearance of the coat, posture, and ambulation; vocalization; and sleep disturbances.[19,27,28] To our knowledge, however, there is no general agreement as to how to rate these signs or their intensity when evaluating animals and the efficacy of

treatment. Nevertheless, the availability of a questionnaire that incorporates the main signs, behavior changes, and daily activities of the animal in a single record has the potential to offer an important tool for the evaluation and treatment of not only chronic pain but also many other chronic diseases, such as diabetes, chronic renal failure, and cardiac disease. Indeed, in human patients, the primary use of QOL questionnaires is not to determine the changes in daily routine caused by chronic pain but to evaluate the results of treatment in cancer patients.[14,17,29,30] They also help in evaluating the prevalence and impact of adverse effects associated with the treatment.[22]

Animals with cancer are known to have various degrees of pain. In the present study, dogs with cancer had a mean pain score of 5.9, indicating that they had a moderate level of pain.[20] The mean health-related QOL score for these dogs was 20.7, which suggests that they had a decreased QOL, compared with healthy dogs for which mean health-related QOL score was 34. Thus, pain in the dogs with cancer adversely affected the dogs' QOL.

In view of our findings, we suggest that the health-related QOL questionnaire will be an important tool in the treatment and follow-up of dogs with cancer and potentially other distinct chronic conditions. Clinicians and researchers dedicated to the treatment of pain may use the present study as a basis for new methods for patient evaluation.

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Appendix

Questionnaire for evaluating health-related quality of life in dogs with signs of pain secondary to cancer.

How much do you think that the disease is disturbing your dog's quality of life?
- Very much (0)
- Much (1)
- A little (2)
- Not at all (3)

Does your dog still do what it likes (eg, play or go for a walk)?
- No (0)
- Rarely (1)
- Frequently (2)
- In a normal way (3)

How is your dog's mood?
- Totally altered (0)
- Some episodes of alteration (1)
- Changed a little bit (2)
- Normal (3)

Does your dog keep its hygienic habits (ie, does your dog clean itself)?
- No (0)
- Rarely (1)
- Less than before (2)
- Yes (3)

How often do you think that your dog feels pain?
- All the time (0)
- Frequently (1)
- Rarely (2)
- Never (3)

Does your dog have an appetite?
- No (0)
- Only eats when forced; will eat more of what it likes (1)
- Little (2)
- Normal (3)

Does your dog get tired easily?
- Yes, always (0)
- Frequently (1)
- Rarely (2)
- No (3)

How is your dog sleeping?
- Very badly; not sleeping at all (0)
- Badly (1)
- Almost normally (2)
- Normally (3)

How often does your dog vomit?
- Always (0)
- Frequently (1)
- Rarely (2)
- Never (3)

How are the intestines of your dog functioning?
- Very badly (0)
- Badly (1)
- Almost normally (2)
- Normally (3)

Is your dog able to position itself to defecate and urinate?
- Never positions itself to urinate or defecate (0)
- Rarely positions itself to urinate or defecate (1)
- Sometimes positions itself to urinate or defecate (2)
- Urinates and defecates normally (3)

How much attention is your dog giving to the family?
- Indifferent (0)
- Little attention (1)
- Increased attention; the dog is needy (2)
- Has not changed (3)

Scores (values in parentheses) for all 12 questions were summed to determine the health-related quality-of-life score. Possible scores ranged from 0 to 36.