Owner assessment of the outcome of total hip arthroplasty in dogs

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Objective—To evaluate owners' perceptions of the outcomes of dogs that have undergone total hip arthroplasty (THA).

Design—Survey.

Sample Population—Owners of 145 dogs that had undergone THA.

Procedure—Surveys were mailed to owners of 353 dogs that underwent THA between 1982 and 1996. Owners were asked to answer multiple-choice questions and provide written comments.

Results—The response rate was 41%. For owners who responded to the survey, time from surgery to completion of the questionnaire ranged from 6 months to 11 years. Overall, 122 respondents (84.1%) rated results of THA in their dog as excellent or good.

Conclusions and Clinical Relevance—Results suggest that owners are generally satisfied with the results of THA in their dogs. (*J Am Vet Med Assoc* 2000;217:1010–1012)

In 1983, Olmstead et al[1] reported on outcome of 216 dogs that underwent **total hip arthroplasty (THA)** between 1976 and 1981, using a commercially available one-piece, cemented, cobalt-chromium prosthesis.[a] Follow-up time ranged from 4 weeks to 5 years, and hip joint function, assessed on the basis of "locomotive ability," was graded as excellent in 172 (79.6%) dogs and good in 25 (11.6%). In a later study involving dogs in which THA was performed between 1981 and 1984, using the same prothesis,[2] Olmstead reported that 139 of 146 dogs (95.2%) had satisfactory function. In 1995,[3] Olmstead reported on outcome of 41 dogs in which THA had been performed, using a modular titanium alloy femoral prosthesis with a cobalt-chromium head.[b] Follow-up time ranged from 2 to 15 months, and owners of 40 of the 41 (98%) dogs reported an improvement in their dogs' quality of life after surgery.

Other authors have also reported outcomes of dogs undergoing THA with cemented prostheses. Gofton and Sumner-Smith[4] reported excellent results for 3 dogs that underwent THA; follow-up time ranged from 8 to 18 months. Lewis and Jones[5] reported that 16 of 20 THA implants were still in place 19 to 34 months after surgery, and that outcome was excellent for 12 (75%) of the 16 and good for 2 (13%). Parker et al[6] reported on outcome of 23 THA performed between 1979 and 1982 in 20 dogs. Follow-up time ranged from 6 months to 4.5 years, and outcome was assessed through clinical evaluation and owner interviews. Results were excellent for 8 THA (35%) and good for 10 (44%). Paul and Bargar[7] evaluated results of 65 THA with a minimum of 6 months of follow-up, and reported that only 7 (11%) had complications.

Surgeons at the Colorado State University Veterinary Teaching Hospital have been performing THA in dogs for more than 15 years. Although anecdotal evidence seemed to indicate a high level of owner satisfaction with the outcome of surgery, no formal survey had ever been performed at this institution to assess the impact of this procedure on dogs and their owners. In addition, none of the previous studies included dogs undergoing THA with the current commercially available prosthesis, which includes a modular femoral component made entirely of cobalt chromium,[b] and the longest follow-up time in these previous studies was 5 years. Therefore, the purpose of the study reported here was to evaluate owners' perceptions of the outcomes of dogs that have undergone THA.

Materials and Methods

A questionnaire was developed, using validated questionnaires developed for assessing outcome of THA in human patients,[8,9] and mailed to 353 owners of dogs that had undergone unilateral or bilateral THA at the Veterinary Teaching Hospital between 1982 and 1996. Owners were asked to complete and return the survey in a postage-paid envelope. Additional written comments were encouraged. Owners of dogs that had undergone bilateral THA were asked to report separately on each side. Owners were asked if their dogs were currently alive or dead and, if their dogs were dead, when and how their dogs had died.

Responses were tabulated. To demonstrate the level of nonresponse bias, age and weight of the dogs at the time of surgery were compared between respondents and nonrespondents, using a *t*-test for samples with unequal variances.

Three prostheses have been used for THA at the Veterinary Teaching Hospital. The first consisted of an ultrahigh molecular weight polyethylene acetabular cup matched with a one-piece cobalt-chromium alloy femoral prosthesis.[a] The second consisted of an ultrahigh molecular weight polyethylene acetabular cup and a modular femoral prosthesis that consisted of a titanium alloy femoral stem with a rounded distal tip and a cobalt-chromium femoral head.[b] The third was similar to the second but had a slightly different geometry and was made entirely of cobalt-chromium.[b]

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Results

One hundred forty-five responses were returned for a 41% response rate. Ninety-nine (68.2%) respondents reported that their dogs were still alive at the time of the survey. Age and weight of the dogs at the time of THA were not significantly different ($P > 0.02$) between respondents and nonrespondents.

Owners reported that 70 of the 145 dogs were receiving pain medication daily (n = 40; 27.6%) or several times a week (30; 20.7%) prior to surgery. An additional 17 dogs (11.7%) were receiving pain medication infrequently and 55 (37.9%) were not receiving any pain medication prior to surgery (owners of 3 dogs did not respond). By comparison, only 26 dogs were receiving pain medication daily (19; 13.1%) or several times a week (7; 4.8%) after surgery. Twenty-three (15.9%) were receiving pain medication infrequently, and 84 (57.9%) were not receiving any pain medication (owners of 12 dogs did not respond). Owners of 98 dogs (67.6%) indicated that surgery completely relieved their dogs' pain, and 33 (22.8%) indicated that surgery appeared to decrease the amount of pain. Only 3 (2.1%) indicated that surgery did not decrease the amount of pain, whereas 9 (6.2%) indicated that their dogs were not in pain prior to surgery, and 2 did not respond. One hundred three (71%) owners reported that THA substantially increased their dogs' function, and 31 (21.4%) indicated that THA increased their dogs' function somewhat. Only 5 (3.4%) indicated that their dogs' function was unchanged after surgery, and 3 (2.1%) indicated that their dogs' function was worse (3 owners did not respond). Overall, 106 (73.1%) owners rated results of the procedure as excellent, 16 (11%) rated them as good, 8 (5.5%) rated them as fair, and 9 (6.2%) rated them as poor (6 owners did not respond).

When asked if the expense of the surgery was justifiable, given the outcome, 92.5% of owners gave a positive answer (definitely yes, 120 [82.8%]; probably yes, 14 [9.7%]), and only 10 indicated that the expense was probably not (4; 2.8%) or definitely not (6; 4.1%) justifiable (1 did not respond). Asked if they would make the same decision to have the surgery for their dogs again, 93.1% of the owners answered in the affirmative (definitely yes, 126 [86.9%]; probably yes, 9 [6.2%]), and only 7 indicated that they probably (4; 2.8%) or definitely (3; 2.1%) would not (3 did not respond).

Fifty (34.5%) owners indicated that their dogs' quality of life was more improved after surgery than they had thought possible, 69 (47.6%) reported a great improvement, 13 (9%) reported a moderate improvement, and 4 (2.8%) reported a slight improvement. Only 2 (1.4%) reported no improvement in their dogs' quality of life, and 1 (0.7%) reported a worsening (6 did not respond). Eighty (55.2%) owners reported that, compared with the period prior to THA, their dogs' health was better, 36 (24.8%) reported that their dogs' health was the same, and 9 (6.2%) reported that their dogs' health was worse (20 did not respond).

Seventy-four (51%) owners reported that their dogs could now run at will without restrictions, and 14 (9.7%) reported that their dogs could run for half a day without causing discomfort. However, 9 (6.2%) reported that an hour of running caused apparent discomfort, 12 (8.3%) reported that < 30 minutes of running caused apparent discomfort, and 14 (9.7%) reported that their dogs could not run without causing apparent discomfort (22 owners did not respond). Ninety-five owners (65.5%) reported that their dogs could now walk at will without restrictions, and 10 (6.9%) reported that their dogs could walk for half a day without causing discomfort. However, 11 (7.6%) reported that an hour of walking caused apparent discomfort, 11 (7.6%) reported that < 30 minutes of walking caused apparent discomfort, and 5 (3.4%) reported that their dogs could not walk without causing apparent discomfort (13 owners did not respond).

The 88 postsurgical "no responses" (ie, excluding the question regarding pain before THA) were investigated, and owners of 23 (50%) of the 46 dogs that were no longer alive accounted for 50 (56.8%) of the "no responses." A small percentage (18; 18.8%) of owners of dogs that were still alive accounted for 38 (43.2%) of the "no response" answers. Some written comments indicated that owners thought that none of the answers applied to them. Owners of 104 dogs answered each postsurgical question.

Time from initial surgery to death, revision surgery, or survey response ranged from 6 months to 11 years. Some owners of dogs with the longest-term follow-up wrote comments that led us to believe that dogs had done well during the first few years after surgery, but that their condition had seemed to deteriorate in recent years. Several owners of dogs that underwent unilateral THA indicated that they thought their dogs would have done better in old age if they had undergone bilateral surgery. Many commented on other health problems, unrelated to THA, which made answering the questions more difficult. Two owners indicated that they wished they had had more information about the recovery period after THA.

Discussion

Results of the present study suggest that owners are generally satisfied with the results of THA in their dogs, that they believe the expense of surgery is justifiable, given the outcome, and that they believe THA had a positive effect on their dogs' health and well-being. The 41% response rate is high for a mailed survey[10] and ages and weights of dogs at the time of surgery were not significantly different between respondents and nonrespondents; however, results must still be interpreted with some caution, as there may have been some degree of nonresponse bias. In addition, the survey included dogs that underwent THA during a 14-year period. A variety of prostheses were used, surgeries were performed by a number of surgeons, and surgical techniques likely improved with time. We did not attempt to correlate results of the survey with date of surgery or prosthesis type, and we recommend that future studies be designed to examine these factors and others that may be associated with outcome.

Owner surveys necessarily provide subjective results, but results of the present study seem to compare favorably with results of previous studies in which

follow-up evaluation included clinical examination. The present study, however, involved more detailed owner ratings and a longer follow-up time, ranging from 6 months to 11 years. In addition, results of a single individual[1-3] dominated the previous studies, and the present study provides results for a separate large population (145 dogs) that underwent surgery at a different institution with different surgeons and different implants. Because results of the present study agree with those of previous studies, we believe that these results can be generalized to results for all surgeons using the same prostheses and surgical techniques.

We suggest that in the future, a tracking system similar to that used for human patients undergoing THA be established for dogs undergoing THA. This would involve administration of a similar survey prior to and at various set times after (eg, 6 months and 1, 2, and 5 years) surgery, so that a dog's condition before THA could be compared with its condition after. This would also allow investigators to determine whether outcome deteriorates over time.

Dog owners faced with making a decision about whether to have this surgery for their dogs may benefit from information provided by owners who previously faced this decision. This is an expensive surgery that requires close supervision during the recovery period, and some owners may be discouraged by the expense and time commitment during the postoperative period. Results of surveys of owners who have gone through this procedure with their dogs may be a useful educational tool for owners faced with making a decision about whether to agree to THA for their dogs.

[a]Richards Canine II Hip Prosthesis, Smith & Nephew Richards Inc, Memphis, Tenn.
[b]Modular Canine Total Hip Replacement System, BioMedtrix, Allendale, NJ.

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Correction: Effect of dietary protein content and tryptophan supplementation on dominance aggression, territorial aggression, and hyperactivity in dogs

In "Effect of dietary protein content and tryptophan supplementation on dominance aggression, territorial aggression, and hyperactivity in dogs" (*JAVMA* 2000;217:504–508), the second sentence in the "Results" section of the structured abstract (page 504) should read, "For territorial aggression, tryptophan-supplemented low-protein diets were associated with significantly lower behavioral scores than low-protein diets without tryptophan supplements." In addition, the second-to-last sentence in the left-hand column on page 505 should read, "Thus, for a dog that weighed 10 kg (22 lb), approximate daily Trp intakes were 300, 500, 420, and 670 mg/d for the LP-Trp, LP+Trp, HP-Trp, and HP+Trp diets, respectively."