Evaluation of client perceptions concerning outcome of cataract surgery in dogs

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Although, to the authors’ knowledge, records of the total number of cataract surgeries performed in dogs are not available, phacoemulsification is one of the more commonly performed ophthalmic surgeries and probably the most commonly performed intraocular surgery in veterinary practice. It has been estimated that > 4,000 cataract surgeries with IOL placement are performed annually on dogs in the United States alone.1 Refinements of technique, training, anesthetic management, surgical instrumentation, perioperative medical management, and the availability of IOLs crafted specifically for dogs have improved surgical outcome. Despite this, surgical complications continue to exist.1,13,17 Investigators have evaluated general success rates and common complications13,16,17,20 and assessed the effect on outcome of cataract stage, surgical techniques,1 unilateral versus bilateral cataract extraction,12 placement and type of IOLs,1 and the presence of diabetes mellitus.2 Surgical outcome has also been assessed by examination of globes enucleated after cataract surgery.1,15 Data generated by these studies provide the basis for advising individual clients regarding general surgical success rates and help to highlight risk factors before and after surgery. As such, they are important in the clinical management of dogs with cataracts, which are often a blinding but treatable ocular disease.

The outcome of cataract surgery has been assessed from clinical and pathologic perspectives; however, to the authors’ knowledge, the client’s perspective of surgical outcome has not been assessed. Although veterinary ophthalmologists can evaluate ocular disease and assess vision in the examination room, owner assessment of their dog’s vision and quality of life based on longer periods of observation of the dog performing in its normal environment and in visually challenging circumstances is most valuable. For cataract surgery to be considered truly successful, both the veterinary ophthalmologist and client must be satisfied with the results. Therefore, the purpose of the study reported here was to compare client perception of outcome of phacoemulsification in dogs with information obtained from medical records. Use of client perceptions to better characterize client or patient characteristics that may predict surgical outcomes was also evaluated.

Materials and Methods

Objective—To compare client perception of outcome of phacoemulsification in dogs with information obtained from medical records.

Design—Retrospective cohort study.


Procedure—Data obtained from medical records included signalment, presence of diabetes mellitus, cataract stage, whether surgery was unilateral or bilateral, intraocular lens (IOL) placement, and postoperative complications. Owners completed a survey concerning outcome of phacoemulsification in their dog. Survey responses from owners classified as satisfied or dissatisfied with the outcome of phacoemulsification on the basis of their willingness, in retrospect, to have the surgery performed again were compared.

Results—Data from medical records and survey responses were available for 108 dogs (203 eyes). Median follow-up was 3 months via medical record review and 12 months via owner survey responses. Most (81%) owners were satisfied with outcome. The most common reason for dissatisfaction was loss of vision after surgery; however, most dissatisfied owners did not return their dog for examinations. Owner perception of success was not associated with patient age, sex, presence of diabetes mellitus, cataract stage, or IOL placement in at least 1 eye but was associated with perceived improvement of their pet’s vision and activity level. Dissatisfied owners were significantly more likely to report that explanation of risks and complications before surgery was inadequate.

Conclusions and Clinical Relevance—Owner perception of outcome after phacoemulsification in dogs was highly favorable. However, surgical risks and the importance of postoperative examinations, particularly in dogs undergoing visual deterioration, must be conveyed to clients. (J Am Vet Med Assoc 2006;228:870–875)
performed secondary to trauma, for an initial cohort of 152 dogs. All dogs underwent a standard phacoemulsification procedure during general anesthesia with neuromuscular blockade with or without placement of a 41 dioptr IOL.\(^{25}\) Owners of those 152 dogs were chosen for follow-up via a survey designed to assess owner perception of surgical outcome. Prior to mailing, the survey was assessed by all veterinary ophthalmologists and ophthalmology residents currently in training at the veterinary medical teaching hospital and by 2 owners of dogs in the initial cohort (a veterinarian and a nonveterinarian; neither employed by the veterinary medical teaching hospital). In the survey, owners were asked to recall the dog's initial problem, whether it had been corrected, the total cost of preoperative assessment and cataract surgery (excluding recheck examinations performed postoperatively), and whether they believed surgical risks and complications had been adequately explained prior to surgery. Owners were asked to use semiquantitative scales to report their assessment of their dog's activity level (1, inactive; 5, moderately active; 10, very active) and vision (1, marked deterioration; 5, unchanged; 10, maximum improvement) 3 and 6 months and 1, 2, 3, and 4 years after surgery. Owners also were asked to describe any changes in attitude or temperament noted in their dogs after surgery. Owners then were asked to select the answer “yes,” “no,” or “unsure” to best describe their feelings as to whether, in retrospect and if the same circumstances arose again, they would have the surgery performed. Finally, owners were asked to grade (on a semiquantitative scale from 1 to 10) the importance of the following factors in that decision: cost, degree of visual improvement, degree of discomfort, number of recheck examinations performed postoperatively, and amount and frequency of medication required postoperatively. For all these factors, a score of 1 was considered not important, 5 was considered moderately important, and 10 was considered very important.

In June 2004, a cover letter requesting their participation in the study, the survey, and a stamped, addressed return envelope were mailed by United States Postal Service to owners of all dogs in the initial cohort. The cover letter indicated that their responses, although not confidential, would not be included in the medical records of any of their pets evaluated at the veterinary medical teaching hospital. Of the 152 surveys mailed, 9 were returned as nondeliverable because the contact information was incorrect. Owners of those dogs were excluded from the study for a final cohort of 143. Approximately 8 weeks after the survey was mailed, each owner of a dog in the final cohort who had not yet responded to the survey (initial nonrespondents) was contacted via telephone. All owners contacted via telephone for whom a message could be left were asked to complete and return the survey. One initial nonrespondent preferred to complete the survey via telephone. In this case, the questions were read exactly from the survey without attempt to elicit or bias the respondent's answers. A second cover letter, identical survey, and stamped, addressed return envelope were sent to all other initial nonrespondents. Survey responses were accepted for a further 8 weeks (ie, approx 16 weeks from the initial survey mailing). All survey responses were entered into a database with corresponding clinical data retrieved from the medical records.

**Review of medical records**—For each of the 143 dogs with owners that received surveys, the following baseline data were retrieved from the medical records: age, sex, and neuter status at the time of surgery; presence or absence of diabetes mellitus; cataract stage; whether unilateral or bilateral cataract surgery was performed; and whether an IOL was placed. Cataracts were classified as incipient, immature, mature, or hypermature. Incipient cataracts included small, focal lens opacities that did not notably interfere with vision. Immature cataracts included those in which the opacity was diffuse, but did not completely obscure the fundic reflection. Total lens opacity with inability to elicit a fundic reflection and causing notable vision loss was considered a mature cataract. Cataracts with evidence of lens capsule wrinkling, mineralization, or resorption were considered hypermature.

Data concerning postoperative complications and visual status were collected from medical records at the examination dates nearest to 3 and 6 months and 1, 2, 3, and 4 years after surgery. The number of complications associated with cataract surgery at each of the postoperative examinations was quantified by a veterinary ophthalmologist (DMJ) reviewing the medical record but unaware of the specific dog or surgeon involved. The following conditions were classified as postoperative complications (regardless of presumed cause): corneal degeneration, corneal lipidosis, steroid keratopathy, ulcerative keratitis, uncontrollable anterior uveitis, vitreous in the anterior chamber, synechia, glaucoma, ocular hypertension, vitreous hemorrhage, vitreous degeneration, optic nerve degeneration, retinal separation or tear, focal or diffuse retinal degeneration, and retinal hemorrhage. Controlled anterior uveitis, corneal fibrosis or opacification of the incision site, keratoconjunctivitis sicca were not considered complications. A dog was considered to have vision after surgery if the medical record indicated that the dog behaved as if it had vision or if both menace response and dazzle reflex were present.

**Statistical analysis**—Survey responses from owners replying to the first or second request were compared by use of \( \chi^2 \) test of homogeneity analyses to examine differences between these respondents as sources of possible bias in follow-up. For all analyses, successful outcome was defined by the owner's response to a survey question in which owners were asked whether, in retrospect and if the same circumstances arose again, they would have the surgery performed. \( \chi^2 \) Analyses also were performed to assess if successful outcome was significantly associated with patient sex, presence of diabetes mellitus, unilateral or bilateral surgery, owner's recollection of whether risks and possible complications had been adequately explained, whether an IOL was placed, or whether the owner believed surgery corrected the problem. Kruksal-Wallis ANOVA was performed to assess whether a successful outcome was significantly associated with patient age, cataract stage, owner's recollection of cost, or number of complications postoperatively. Data from the medical records for dogs for which survey data were received and those for which none was received were compared by use of Student \( t \) test (age) or \( \chi^2 \) analyses (sex, neuter status, and presence of diabetes mellitus). For all statistical analyses, values of \( P < 0.05 \) were considered significant.

**Results**—From the final cohort of 143 dogs, 88 completed surveys were returned in response to the first mailing and an additional 19 surveys were returned in response to the second mailing to initial nonrespondents. One initial nonrespondent completed the survey via telephone resulting in 108 responses. This represented first time, second time, and total response rates of 61.5%, 14.0%, and 75.5%, respectively. No significant differences concerning major outcome variables such as the owner's assessment of successful outcome (\( P = 0.87 \)), cost (\( P = 0.16 \)), vision postoperatively (\( P = 1.0 \)), signs of patient discomfort (\( P = 0.27 \)), number of recheck examinations performed postoperatively (\( P = 0.21 \)), or amount and frequency of medication required...
postoperatively ($P = 0.16$) were detected between responses of first- and second-time respondents. Accordingly, for all remaining analyses, data from first- and second-time respondents were combined. Information was available from owner survey responses for a median follow-up period of 12 months. However, the number of eyes for which survey data specific to postoperative time points were available for review decreased with increasing postoperative interval (Table 1).

By use of each owner’s response to the survey question in which they were asked whether, in retrospect and if the same circumstances arose again, they would have the surgery performed, 88 (81%) owners were classified as satisfied, 13 (12%) as dissatisfied, and 5 (5%) as unsure. Two owners returned surveys but did not respond to this question. Satisfied and dissatisfied owners did not differ in the weight they placed on the importance of cost, degree of visual improvement, degree of discomfort, number of recheck examinations postoperatively, or amount and frequency of medications required postoperatively in their decision to have the procedure performed if the same circumstances arose again (Table 2). An IOL had been placed in at least 1 eye of 91 dogs owned by satisfied owners and of 6 dogs owned by dissatisfied owners. Of the 13 owners who reported that they would not have the surgery performed again, the reasons they noted included loss of vision again sometime after surgery (8 owners), difficulty controlling diabetes at some point after surgery (3 owners), not good value for money (1 owner), or development of an unrelated neoplastic process (2 owners). One owner reported both vision loss postoperatively and that the process was too expensive. Considering dogs owned by the 13 dissatisfied owners, vision was present bilaterally in 5 dogs and unilaterally in 3 dogs postoperatively and 1 dog was blind at the last postoperative period in which it was examined. Four dogs were not returned for the 3-month or later recheck examinations. Of the 8 owners who claimed that their dogs lost vision after surgery, 5 did not return their dogs for recheck examinations requested. Each of these dogs had vision at the last postoperative period in which an examination was performed.

Eighty-five of 105 (81%) respondents believed that cataract surgery corrected their dog’s problem. Of those, 80 (94%) were satisfied owners and 2 (2.4%) were dissatisfied owners. One client was not sure whether they would have the procedure performed again, and 2 clients, although they indicated that surgery corrected the problem, did not respond to the question concerning whether they would have the procedure performed again. No significant association was detected between owner perception of successful outcome and patient age ($P = 0.80$), patient sex ($P = 0.52$), presence of diabetes mellitus ($P = 0.26$), cataract stage (right eye: $P = 0.37$; left eye: $P = 0.47$), or whether an IOL was placed in at least 1 eye ($P = 0.08$). However, considering the last postoperative period assessed for each patient, the owners’ perception of successful outcome was positively associated with their perception of improvement in their dog’s vision ($P < 0.001$) and activity level ($P = 0.014$) postoperatively. Owners’ perception of activity level and vision declined with increasing postoperative interval (Figure 1). However, for at least 3 years after surgery, satisfied owners rated their dogs vision postoperatively better than it had been preoperatively.

Although presence of 1 or more complications did not significantly affect client satisfaction ($P = 0.26$), dissatisfied owners were significantly more likely to report that explanation of risks and complications preoperatively was inadequate ($P < 0.001$) and were significantly more likely to believe that surgery did not correct the primary ocular problem ($P < 0.001$).

Data obtained from medical records were reviewed for all 108 dogs (203 eyes) for which survey data were available. Information from medical record review was available for a median follow-up period of 3 months. The number of eyes for which medical record data specific to postoperative periods was available for review

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Table 1—Number of eyes of dogs in which cataract surgery had been performed and for which owner survey or medical record data were available at each postoperative period assessed.

<table>
<thead>
<tr>
<th>Postoperative period</th>
<th>Data from owner surveys</th>
<th>Data from medical records</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>185</td>
<td>169</td>
</tr>
<tr>
<td>6 months</td>
<td>176</td>
<td>89</td>
</tr>
<tr>
<td>1 year</td>
<td>148</td>
<td>52</td>
</tr>
<tr>
<td>2 years</td>
<td>101</td>
<td>11</td>
</tr>
<tr>
<td>3 years</td>
<td>71</td>
<td>8</td>
</tr>
<tr>
<td>4 years</td>
<td>49</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2—Owner-reported importance of factors affecting whether, in retrospect, they would have cataract surgery performed in their dog if the same circumstances arose again.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Median (range) score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Satisfied owners</td>
</tr>
<tr>
<td>Cost</td>
<td>6 (1–10)</td>
</tr>
<tr>
<td>Degree of visual improvement</td>
<td>10 (6–10)</td>
</tr>
<tr>
<td>Degree of discomfort</td>
<td>10 (2–10)</td>
</tr>
<tr>
<td>No. of recheck examinations postoperatively</td>
<td>6 (1–10)</td>
</tr>
<tr>
<td>Amount and frequency of medication required postoperatively</td>
<td>6 (1–10)</td>
</tr>
</tbody>
</table>

All factors were graded on a semiquantitative scale; a score of 1 was considered not important, 5 was considered moderately important, and 10 was considered very important. Owners were classified as satisfied or dissatisfied depending on their response to a survey question asking whether, in retrospect and if the same circumstances arose again, they would have the surgery performed. Owners were asked to select 1 answer to this question from the following: “yes,” “no,” or “unsure.” Unsure owners were omitted from this analysis.
decreased with increasing postoperative interval. However, during each postoperative period, the number of eyes for which medical record data were available was always less than the number of eyes for which owner survey data were available (Table 1). Median age of dogs was 8.8 (range, 0.3 to 15.1) years. Forty-seven (44%) dogs were spayed females, 6 (5.5%) were sexually intact females, 49 (45%) were neutered males, and 6 (5.5%) were sexually intact males. Forty-nine (45%) dogs had diabetes mellitus. Of those cataracts removed, 6 (3%) were staged as incipient, 58 (28%) as immature, 101 (50%) as mature, and 38 (19%) as hypermature during the preoperative examination. Cataract surgery was performed bilaterally in 95 (88%) dogs, in the right eye only in 5 (5%) dogs, and in the left eye only in 8 (7%) dogs. Placement of an IOL was performed in 105 (52%) eyes of 62 (58%) dogs. However, the number of IOLs placed per year increased notably after 2001 (Figure 2). An IOL was placed in 21 eyes after removal of hypermature cataracts, in 53 eyes after removal of immature cataracts, and in 2 eyes after removal of incipient cataracts.

Fewer dogs were evaluated as postoperative interval increased (Table 1). No complications were noted in the medical records at any time during the 4-year period for 58 (54%) dogs (123 [61%] eyes). Common unresolved complications noted at the last postoperative ophthalmic examination for which data were available for each dog included corneal degeneration, corneal lipidosis, or steroid keratopathy (20 eyes; 13 dogs); anterior uveitis (16 eyes; 13 dogs); glaucoma or medically controlled ocular hypertension (13 eyes; 11 dogs); and local or extensive retinal or optic nerve degeneration (7 eyes; 3 dogs). During the last postoperative ophthalmic examination for which data were available for each dog, 91 (84%) dogs had vision in both eyes, 12 (11%) had vision in only 1 eye, 1 (1%) had nystagia attributed to progressive retinal atrophy, and 4 (4%) did not have vision in either eye irrespective of ambient light conditions. An IOL was placed in 102 eyes later determined to have vision and in 3 eyes later determined to have no vision.

To assess how well dogs about which survey data were received reflected the total population of dogs undergoing cataract surgery throughout the same period, medical records also were reviewed for 35 dogs (64 eyes) for which survey data were not received from owners. Median age of dogs in this subpopulation was 9.0 (range, 0.2 to 15.4) years. Eleven (31%) dogs were spayed females, 2 (6%) were sexually intact females, 21 (60%) were neutered males, and 1 (3%) was a sexually intact male. Thirteen (37%) dogs had diabetes mellitus. Median age (P = 0.81), proportion by sex (P = 0.30), proportion by neuter status (P = 0.91), and proportion of dogs with diabetes mellitus (P = 0.51) did not significantly differ between those dogs for which survey responses were received and those for which responses were not received. Of those cataracts removed from dogs for which survey data were not received, 1 (2%) was staged during the preoperative examination as incipient, 14 (22%) as immature, 32 (50%) as mature, and 16 (25%) as hypermature. Cataract surgery was performed bilaterally in 29 (83%) dogs, in the right eye only in 2 (6%) dogs, and in the
left eye only in 4 (11%) dogs. Placement of an IOL was performed in 30 (47%) eyes of 20 (37%) of those dogs. No complications were noted in the medical records at any time during the 4-year period for 23 (66%) dogs (33 [53%] eyes). Common unresolved complications detected during the last postoperative ophthalmic examination for which data were available were similar to those for dogs for which survey data were obtained.

**Discussion**

To the authors’ knowledge, the study reported here is the first to use a survey to gauge owner perception of the outcome of phacoemulsification in dogs. The survey response rate from owners of the final cohort of 143 dogs was 76%. This represents a considerably higher response rate than commonly attained and reported in the veterinary literature (21% to 65%).

Additional strengths of our study include the median follow-up time permitted by owner survey response (12 months), which is notably longer than follow-up times (1.4 to 5.8 months) reported in similar studies. The number of dogs in our study was similar to that (56 to 220 dogs) reported in other studies.

Results of our study expand on current knowledge of the outcome of phacoemulsification and have practical implications for owners and for referring veterinarians and veterinary ophthalmologists counseling owners considering this procedure.

Results of our study indicated that phacoemulsification successfully restored vision in 81% or 95% of dogs according to owners’ reports or clinicians’ assessment of vision during the most recent ophthalmic examination, respectively, which are clinically relevant methods of assessing surgical success in nonverbal patients. These success rates are similar to those (63% to 90%) in other studies, which have reported surgical success as a function of IOL placement, surgical technique, postoperative complications, unilateral versus bilateral surgery, and presence of diabetes mellitus. Although most (83%) owners believed that surgery was successful in correcting their dog’s problem and would have the surgery performed if the same circumstances arose again (81%), analysis of data from dissatisfied owners also provides important insights. Understandably, the most commonly reported reason for owner dissatisfaction after phacoemulsification was failure of the procedure to restore their dog’s vision for a satisfactory period postoperatively. Unexpectedly, most (8/13) dissatisfied owners in our study did not return their dog for regular recheck examinations or request an examination when they became dissatisfied with the surgical outcome. For the majority (6/8) of these dogs, the medical record indicated that vision was present in at least 1 eye during the most recent examination. This information has 2 important implications. First, those dogs would be lost to follow-up in studies relying on data obtained from medical records alone. This likely explains some differences between our results and those of other studies and also contributes to the difference in successful outcome as reported by veterinarians (95%) and owners (83%) during the longest postoperative period in our study. Second, these data confirm that continued follow-up examinations in dogs after cataract surgery are important, especially in those dogs in which owners detect a problem.

Reasons owners did not return dogs for recheck evaluations were not assessed in our study; however, broad causal associations may be postulated. First, it is possible that failure of an owner to return his or her dog for evaluation postoperatively resulted in unrecognized ocular or systemic disease. This supposition is supported by reports that anterior uveitis and secondary glaucoma are frequent causes of cataract surgery failure, sometimes at protracted times after surgery, and reports that surgical success rates decrease with increasing postoperative interval. Second, it is possible that visual loss was noted by the owner but that reevaluation was not sought. Regardless, our results suggested that owners failing to return their dogs for essential postoperative evaluations are likely to be or become dissatisfied with surgical outcome. Therefore, adequate communication between the veterinary ophthalmologist, referring veterinarian, and client concerning the importance of examinations after phacoemulsification is essential. This becomes especially important when loss of vision is noted at any time postoperatively. Other stated reasons for client dissatisfaction, such as difficulty controlling diabetes mellitus, cost of treatment, and development of unrelated neoplasia postoperatively, further emphasize the need for postoperative examinations and ongoing communication between the referring veterinarian, client, and veterinary ophthalmologist.

Results of our study indicated that owner perception of outcome after phacoemulsification in dogs generally is highly favorable. The survey results also indicated that conversations with owners before surgery should be used to stress the importance of regular recheck examinations, particularly in dogs undergoing visual deterioration postoperatively. Referring veterinarians and veterinary ophthalmologists also should be aware of and inform owners concerning possible disruption of diabetic management attributable to the anesthetic episode, hospitalization and withholding of food, topical administration of corticosteroids, and altered activity levels once the patient regains sight.

References

6. Nelms SR, Davidson MG, Nasisse MP, et al. Comparison of corneal and scleral surgical approaches for cataract extraction by...