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Studies on Occurrence of Ocular Diseases in Dogs with Emphasis on Occurrence of Glaucoma

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A B S T R A C T

The present study was carried out to evaluate the occurrence of different ocular diseases and to study the occurrence of glaucoma in dogs over a period of three years from January 2016 to January 2019. The occurrence of different ophthalmic affections was analysed in different age group, gender, season and breed of dogs. Out of the 28,254 case records of dogs evaluated, 356 case records of dogs were of ocular diseases. The overall per cent occurrence of ocular diseases during this period was 1.26 per cent. Conjunctivitis (27.25%) was the most common ocular disease observed. The per cent occurrence of ocular diseases was highest in puppies (33.71%) and male dogs (80.34%) and was seen highest during Summer season (36.24%). Among different breeds, the highest per cent of ocular diseases was seen in Non-descript dogs (19.94%) followed by Pugs (16.85%) and Labrador retrievers (15.73%). The per cent occurrence of glaucoma was highest in adult dogs (32.14%). Gender wise occurrence of glaucoma was maximum in male dogs (60.71%). Among different breeds, the maximum per cent occurrence of glaucoma was seen in Non descript dogs (25%) followed by Pomeranians (21.43%) and Labrador retrievers (14.29%).

Introduction

Eye is very a sensitive organ, the function of which may be affected even with mild insult to its homeostasis, due to direct injury or due to other local or systemic diseases and hence studies on ocular affections may provide information on prevalence of ocular diseases and also help enhance diagnostic possibilities and treatment options (Kumar *et al.*, 2018). Hence the objective of the present study was to study the occurrence of different ocular diseases in dogs and to study the occurrence of glaucoma in dogs. This study was planned to assess the magnitude of different ocular diseases and occurrence of glaucoma in dogs.

Materials and Methods

The study was conducted to find out the occurrence of different ocular disorders with respect to breed, age, season and gender of dogs presented to the Veterinary College Hospital,Bangalore over a period of three years from January 2016 to January 2019. Further, a retrospective study of occurrence of glaucoma specifically based on age, breed and gender was made by evaluating the records maintained at Veterinary College Hospital, Bangalore during the same period.

Results and Discussion

Occurrence of ocular diseases in dogs

The overall occurrence of ocular disorders during January 2016 to January 2019 based on the evaluation of case records maintained at Veterinary College Hospital, Bangalore was found to be 1.25 per cent in dogs (Table 1). The occurrence of ocular diseases during January 2016 to December 2016, January 2017 to December 2017, January 2018 to January 2019 were 0.70, 1.43 and 1.79 per cent respectively (Table 1).

The overall occurrence of ocular diseases in the present study was lower as compared to the findings of Tyagi (2009), Akinrinmade and Ogungbenro (2015) and almost similar to findings of Kumar *et al.,* (2018). Tyagi (2009) reported an incidence rate of 8.96 per cent in dogs, Akinrinmade and Ogunbenro (2015) reported an incidence rate of 6.62 per cent whereas Kumar (2018) reported the incidence of eye affections in dogs to be 1.33 per cent. Sushma (2010) reported the incidence of eye affections in dogs to be 1.85 per cent. This variation can probably be attributed to different geographical areas in which study has been carried out . Pratap *et al.,* (2005) and Tamilmahan (2013) reported higher incidence of ocular affections to be associated with unfavourable weather conditions.

Of the various ocular disorders presented, conjunctivitis (27.24%), glaucoma (7.86%), cataract (11.79%), bilateral cataract (2.42%), corneal opacity (5.89%), cherry eye (8.70%), corneal ulcer (11.51%), uveitis (1.40%), keratitis (2.24%), traumatic injury (5.89%), proptosis of eyeball (4.49%) were observed to be the most common ocular diseases in dogs (Table 3, Fig 2).

Different ocular diseases such as trauma to the eye, corneal opacity, conjunctivitis, corneal ulcers, keratitis, cataract, blepharitis, entropion and ectropion were reported to be the more common ocular diseases of dogs by Kalaiselvan *et al.,* (2009). Sale *et al.,* (2013) reported highest incidence of cataract followed by corneal ulcer, cherry eye, progressive retinal atrophy, corneal melanosis, retinal detatchment, corneal opacity, corneal oedema, hypopion and hyphema.Kumar *et al.,* (2015) reported pigmentary keratitis/ keratoconjunctivitis (21.7%), corneal ulcer/injury (21.7%) followed by corneal opacity (18.3%), epiphora (11.6%), cloudy eye (8.3%), cataract (6.7%), blepheritis (6.7%) and dry eye (5%) as the most common ocular disorders in dogs.

Age – wise occurrence of ocular diseases in dogs

The dogs were classified into different age groups such as puppies (<7 months), young adults (7 months to 2 years), adults (>2years to 7 years) and aged (>7years) as per classification described by McCandlish *et al.,* (1978).It was observed that occurrence of ocular disorders in puppies (< 7 months), young adults (7 months to 2 years), adults (>2 years to 7 years) and aged dogs (>7 years) were 33.70 per cent, 17.41 per cent, 28.65 per cent and 20.22 per cent respectively. Highest occurrence of ocular disorders was observed in puppies followed by adults, aged dogs and young adult dogs (Table 3).

This is in agreement with the findings of Kumar *et al.,* (2018) who reported that a majority of ophthalmic affections were recorded in younger age group of dogs with 51.7 per cent followed by adults with 36.7 per cent and aged dogs with 11.6 per cent. This may be attributed to the playful nature of younger dogs which made them more prone to traumatic injuries. Further the excessive attention and care provided to them resulted in more animals being presented for veterinary care.

However, the results of present study is contrary to the observations of Tyagi (2009) and Tamilmahan *et al.,* (2013) both of whom reported increased incidence of ocular diseases in dogs over 5 years of age. Sale *et al.,* (2013) reported that incidence of ophthalmic affections in dogs was more in dogs between 5 to 10 years of age. Kalaiselvan *et al.,* (2009) also made similar observantions and reported that ocular affections are more in dogs aged between 5 to 10 years.

The gender – wise occurrence of ocular diseases was 80.33 per cent in males and 19.66 per cent in females (Table 5). This observation is in agreement with the findings of Kalaiselvan *et al.,* (2009), Sushma (2010) and Kumar *et al.,* (2018) whereas Akinrinmade and Ogungbenro (2015) reported higher incidence of ocular affections in males than in females. However, Pratap *et al.,* (2005) reported that ophthalmic conditions may not be sex linked and different ocular diseases show no specific predilection for gender. Further, as a rule male dogs are preferred by most owners and hence probably more number of male dogs were presented and that could have resulted in overrepresentation of the clinical cases.

The breed-wise occurrence of ocular diseaseswas found to be highest in Non-descript dogs with 71 cases (19.94%) followed by 60 cases of Pugs (16.85%), 56 cases of Labrador Retrievers (15.73%), 32 cases of Pomeranian (8.98%), 29 cases of Schitzus (8.14%), 18 cases of Cocker Spaniels (5.05%), 17 cases of Golden Retrievers (4.77%), 14 cases of German Shepherds (3.93%), 14 cases of Rottweillers (3.93%), 9 cases of Cross bred dogs (2.52%), 10 cases of Boxers (2.80%), 3 cases of Saint Bernards (0.84%), 5 cases of Seiberian Huskies (1.40%), 5 cases of Dachshunds (1.40%), 1 case of Bulldog (0.28%), 11 cases of Beagles (3.08%) and 1 case of Pekingese (0.28%). (Table 4).

Earlier workers have reported different incidence rates for different conditions in different breeds of dogs. Breeds such as Shih Tzu, Pekingese and Yorkshire Terrier have highest incidence of ulcerative keratitis (Joon *et al.,* 2009). The highest incidence of glaucoma occurred in American Cocker Spaniel, Basset Hound, Chow Chow, Shar – Pei, Boston Terrier, Wire Fox Terrier, Norwegian ElkHound, Siberian Husky, Cairn Terrier and Miniature Poodle as reported by Gelatt and Mackay (2004). Bedford (2017) reported higher prevalence of open-angle glaucoma (POAG) in the Beagle and Elkhound breeds. Sudha (2005) recorded the prevalence of cataract to be more in Spitz followed by non-descript dogs.

Bulldogs, Chihuahuas, Cocker Spaniels, Beagles, Pekingeses, Neopolitan Mastiffs and Basset Hounds were reported to have higher incidence of cherry eye (Herrera, 2005). Breed wise incidence of ocular disease was maximum in Spitz (65%) and least in Dalmatians and Beagles (0.12% each) as reported by Sale *et al.,* (2013). Kumar *et al.,* (2018) observed pigmentary keratitis/ keratoconjunctivitis to be more in Pugs, corneal injury was higher in non – descript breeds and pugs, corneal opacity and cataract

was higher in Labrador Retrievers and German Shepherd dogs. The higher incidence of certain eye diseases among certain breeds of dogs could be due to hereditary predisposition of certain diseases such as cataract as suggested by Baumworcel *et al.,* (2009). The difference in incidence of different ocular diseases reported by different authors may be due to the popularity of certain breeds in different geographical areas as reported by Joon *et al.,* (2009).

The highest occurrence of ocular diseases was recorded during Summer with 129 cases (36.23%), followed by South-West Monsoon with 90 cases (25.28%), North-East Monsoon with 81 cases (22.75%) and Winter with 56 cases (15.73%) (Table 6).

This observation is in accordance with Tamilmahan *et al.,* (2013) who reported higher incidence of ocular diseases during summer followed by North East monsoon. Incidence of ocular diseases in summer may be influenced by dust, pollen grain and other pollutants in the external environment which makes animal more prone for eye infections (Osmani *et al.,* 2000).

Occurrence of Glaucoma

A detailed study was made specifically on the occurrence of glaucoma in dogs based on the case records maintained at Veterinary College Hospital, Bangalore.

Out of 28 cases of glaucoma, occurrence was found to be more in Non-Descript dogs (7 cases out of 28 dogs, 25%) followed by Pomeranians (6 cases out of 28 dogs), Labrador Retrievers (4 cases out of 28 dogs, 14.28%), Pugs (3 cases out of 28 dogs, 10.71%), German Shepherds (2 cases out of 28 dogs, 7.14%), Sieberian Huskies (2 cases out of 28 dogs, 7.14%), Golden Retrievers (1 case out of 28 dogs, 3.57%), Shih tzus (1 case out of 28 dogs, 3.57%) and Cocker Spaniels (1 case out of 28 dogs, 3.57%) (Table 7).

In a study by Gelatt and Mackay 2004 , the highest incidence of glaucoma occurred in American Cocker Spaniels, Basset Hounds, Chow Chows, Shar – Peis, Boston Terriers, Wire Fox Terriers, Norwegian ElkHounds, Siberian Huskies, Cairn Terriers and Miniature Poodles. Bedford (2017) reported higher prevalence of open-angle glaucoma (POAG) in the Beagle and Elkhound breeds. However, Gelatt and Mackay (2004) reported thatin many breeds the high prevalence of the glaucomas suggested a genetic basis. Maggs *et al.,* (2013) reported that , in the Beagle, POAG is an inherited autosomal recessive trait.

Out of 28 cases of glaucoma, 17 dogs were male (60.71%) and 11 dogs were female (39.28%) (Table 9). Gelatt and Mackay (2004) reported predominance of females with glaucoma occurred in the American Cocker Spaniels, Basset Hounds, Cairn Terriers, Chow Chows, English Cocker Spaniels, Samoyeds and Siberian Huskies, and a predominance of males occurred in the Australian Cattle Dogs and St Bernards.

However, Pratap *et al.,* (2005) reported that ophthalmic conditions may not be sex linked and different ocular disorders show no specific predilection for gender.

The occurrence of glaucoma in different age groups were recorded. A total of 28 cases were recorded out of which 6 cases of puppies (<7months) (21.42%), 5 cases of young adults (7 months to 2 years) (17.85%), 9 cases of adults (>2 years to 7 years) (32.14%) and 8 cases of aged dogs (>7 years) (28.57%) were recorded (Table 8).

Table.1 Year-wise incidence of ocular diseases in dogs from January 2016 to January 2019

Year	Total number of dogs presented	Number of dogs with ocular diseases	Per cent occurrence
January2016 to December 2016	10,761	76	0.70
January 2017 to December 2017	9596	138	1.43
January 2018 to January 2019	7897	142	1.79
Total	**28254**	**356**	**1.25**

Table.2 Overall occurrence of different ocular diseases in dogs from January 2016 to January 2019

Condition	Number of dogs	Per cent occurrence (n=356) with respect to ocular disorders	Per cent occurrence (n=28254) with respect to overall clinical conditions
Conjunctivitis	97	27.25	0.343
Cataract	42	11.80	1.486
Corneal ulcer	41	11.52	0.145
Cherry eye	31	8.70	0.109
Glaucoma	28	7.86	0.099
Corneal opacity	21	5.90	0.074
Traumatic injury to eye	21	5.90	0.074
Proptosis of eye ball	16	4.49	0.056
Bilateral cataract	9	2.52	0.031
Keratitis	8	2.25	0.028
Uveitis	5	1.40	0.017
Corneal oedema	5	1.40	**0.017**
Pigmentary keratitis	4	1.12	**0.014**
Progressive retinal atropy	4	1.12	**0.014**
Eyelid tumor	4	1.12	**0.014**
Entropion	3	0.84	0.010
Panopthalmitis	3	0.84	0.010
Keratoconjunctivitis	2	0.56	**0.007**
Buphthalmos	2	0.56	**0.007**
Squamous cell carcinoma	2	0.56	**0.007**
Stye	1	0.28	**0.004**
Staphyloma	1	0.28	**0.004**
Blepheritis	1	0.28	**0.004**
Dermatocele	1	0.28	**0.004**
Lenticular opacity	1	0.28	**0.004**
Nuclear sclerosis	1	0.28	**0.004**
Chemosis	1	0.28	**0.004**
Prolapse of third eyelid	1	0.28	**0.004**

Table.3 Age – wise occurrence of ocular diseases in dogs from January2016 to January 2019

Age group	Occurrence in numbers	Per cent occurrence (%) n=356	Per cent occurrence (%) n=28254
Puppies (<7months)	120	33.70	0.4247
Young Adult (7 months to 2 years)	62	17.41	0.2194
Adult (>2 years to 7 years)	102	28.65	0.3610
Aged (>7 years)	72	20.22	0.2548

Table.4 Breed – wise occurrence of ocular disease conditions in dogs from January 2016 to January 2019

Breed	Occurrence in number	Per cent occurrence (%) n=356	Per cent occurrence (%) n=28254
Non-descript	71	19.94	0.2512
Pug	60	16.85	0.2123
Labrador	56	15.73	0.1982
Pomeranian	32	8.98	0.1132
Schitzu	29	8.14	0.1026
Cocker Spaniel	18	5.05	0.0637
Golden Retriever	17	4.77	0.0601
German Shepard	14	3.93	0.0495
Rottweiller	14	3.93	0.0495
Cross bred	09	2.52	0.0318
Boxer	10	2.80	0.0353
Saint Bernard	03	0.84	0.0106
Seiberian Husky	05	1.40	0.0176
Dachshund	05	1.40	0.0176
Bulldog	01	0.28	0.0035
Beagle	11	3.08	0.0389
Pekingese	01	0.28	0.0035

Table.5 Gender – wise occurrence of ocular diseases in dogs from January2016 to January 2019

Gender	Occurrence in numbers	Per cent occurrence n=356	Per cent occurrence n=28254
Male	286	80.33	1.0122
Female	70	19.66	0.2477

Table.6 Season – wise occurrence of ocular diseases in dogs from January 2016 to January 2019

Season	Occurrence in number	Per cent occurrence n=356	Per cent occurrence n=28254
Winter Season (January to February)	56	15.73	0.1982
Summer Season (March to May)	129	36.23	0.4565
South –West Monsoon (June to September)	90	25.28	0.3185
North – East Monsoon (October to December)	81	22.75	0.2866

Table.7 Breed – wise occurrence of glaucoma in dogs from January2016 to January 2019

Breed	Occurrence in numbers	Per cent occurrence (%) n=28
Non-descript	7	25
Pomeranian	6	21.42
Labrador Retriever	4	14.28
Pug	3	10.71
German Shepherd	2	7.14
Seiberian Husky	2	7.14
Golden Retriever	1	3.57
Cocker Spaniel	1	3.57

Table.8 Age – wise occurrence of glaucoma in dogs from January2016 to January 2019

Age group	Occurrence in numbers	Per cent occurrence n=28
Puppies (<7months)	6	21.42
Young Adult (7 months to 2 years)	5	17.85
Adult (2 years to 7 years)	9	32.14
Aged (>7 years)	8	28.57

Table.9 Gender – wise occurrence of glaucoma in dogs from January 2016 to January 2019

Gender	Occurrence in numbers	Percent occurance (%) n=28
Male	17	60.71
Female	11	39.28

This observation is in agreement with findings of Gelatt and Mackay (2004) and Kato *et al.*, (2006). Majority of the breeds of dogs with glaucoma were between the age group of 4 and 10 years as observed by Gelatt and Mackay (2004).The mean age of dogs with glaucoma was observed to be more than middle age in almost all the breeds (Kato *et al.*, 2006).

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