



Occurrence of intraocular and orbital diseases in dogs: A retrospective study

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Received: 26 October 2022; Accepted: 5 January 2023

Keywords: Dog, Intraocular disease, Orbital disease, Proptosis, Retina, Tumours

Veterinary ophthalmology is the specialized branch of veterinary medicine that deals with diagnosis and treatment of eye conditions in animals. It depends on good clinical observation of the eyes and interpretation to provide accurate diagnosis. Due to the transparent characteristics of the cornea, aqueous humour, lens, and vitreous humour, the eye lends itself to visual inspection like no other organ. This enables the examiner to visually evaluate the optic nerve, which is connected directly to the brain. Majority of the incidence studies with respect to veterinary ophthalmology in India are on eyelid, corneal and conjunctival pathologies, glaucoma and cataract (Ramani *et al.* 2012 and 2013, Tamilmahan *et al.* 2013, Priyanka *et al.* 2018, Soundarya *et al.* 2020). In the current study, incidence of various other orbital and intraocular diseases like exophthalmos, enophthalmos, anophthalmia, proptosis, retrobulbar tumours, amaurosis, hyphema, cataract, lens luxation, retinal degeneration, retinal detachment, panophthalmitis, and intraocular tumour were studied. Advanced diagnostic facilities are required to confirm such ophthalmic diseases in veterinary hospitals. The usage of computed tomography and ultrasonography has helped in diagnosing difficult cases like retrobulbar lesions and amaurosis. Hence, this incidence study of our research would serve as a good reference.

The study was conducted in Small Animal Ophthalmology unit of Madras Veterinary College Teaching Hospital during 2018 to 2021. The data regarding the incidence of various ophthalmic disorders like exophthalmos, enophthalmos, anophthalmia, proptosis, amaurosis, hyphema, cataract, lens luxation, retinal degeneration, retinal detachment, panophthalmitis, intraocular tumour and retrobulbar tumours during the study period (January 2018 - December 2021) were collected and they were categorized based on the breed, age and sex. These cases were diagnosed using indirect ophthalmoscope (V1 07, Appasamy Associates) with condensing lens of +20 Dioptre convex aspheric viewing lens, tonopen (Reichert Tono-Pen® Vet) and

portable slit lamp biomicroscope (PSL AIA-11, Appasamy Associates). A 38 mm linear array transducer of 6-18 MHz (Esaote, model: my Lab Class C Advanced, series 6200, Italy S.P.A) was used. For cases which required computed tomography scan, third generation Toshiba Alexion 16 Multi-slice scanner machine Model no. TSX-032A (2K201-099EN*B) was used.

Incidence of ophthalmic diseases: A total of 14,747 dogs were presented to Small Animal Ophthalmology unit of Madras Veterinary College Teaching hospital for different ophthalmic diseases. Out of which, 649 (4.4%) dogs had various ophthalmic disorders with respect to this study like exophthalmous, enophthalmous, anophthalmia, proptosis, amaurosis, hyphema, cataract, lens luxation, retinal degeneration, retinal detachment, panophthalmitis, intraocular tumour and retrobulbar tumours (Table 1 and Fig. 1). Cataract accounted for around 26.19% (n=170), followed by retinal detachment at 14.79% (n=96), proptosis at 14.64% (n=95), amaurosis at 7.86% (n=51), panophthalmitis at 6.78% (n=44), hyphema at 5.39% (n=35), lens luxation at 3.08% (n=20), glaucoma at 2.31% (n=15), exophthalmos at 2.16% (n=14). Incidence of intraocular tumours was 1.23% (n=8) and retrobulbar tumours was 0.92% (n=6). Enophthalmia (0.46%) and anophthalmia (0.46%) were both less than 1%. The remaining 14,098 (95.6%) canines were diagnosed with corneal and extraocular diseases which were not included in this incidence analysis.

Breed-wise incidence of ophthalmic diseases: In the current study, cataract constituted a high incidence of 26.19%, which correlated with the findings of Ramani *et al.* (2012 and 2013). It showed a uniform distribution among the different age groups and was higher at 8 years of age (12.35%). All breeds were represented except Rottweiler, Dalmatian, Miniature Pinscher, Kombai, and Bully Kutta and was predominant in non-descript dogs (29.41%). In contrary to this, Tamilmahan *et al.* (2013) reported more incidences in Spitz (60%). This could be due to the increased longevity of non-descript dogs in Tamil Nadu and the changing trends in breed preference among pet parents.

Out of 14 cases of exophthalmous, 57.14% (n=8) was

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reported in pugs, followed by 21.43% (n=3) in Labrador Retriever. Enophthalmous (n=3) was observed in one dog in each of the following breeds: Non-descript (33.33%), Golden retriever (33.33%), and Bully Kutta (33.33%). Anophthalmia was recorded in one dog (33.33%) of each of the following breeds: Rottweiler, Great Dane, and Non-descript.

Table 1. Occurrence of ophthalmic diseases during the period 2018 to 2021

Ophthalmic diseases	Number of cases	Percentage (%)
Exophthalmos	14	2.16
Enophthalmos	3	0.46
Anophthalmia	3	0.46
Proptosis	95	14.64
Amaurosis	51	7.86
Hyphema	35	5.39
Cataract	170	26.19
Lens luxation	20	3.08
Glaucoma	15	2.31
Retinal degeneration	89	13.71
Retinal detachment	96	14.79
Panophthalmitis	44	6.78
Intraocular tumour	8	1.23
Retrolbulbar tumour	6	0.92
Total	649	100

Proptosis constituted to 14.64% of ophthalmic afflictions in the study period and majority were non-descript dogs (60%), followed by Pug (18.95%) and Spitz (9.47%). This might be because of the increased risk of traumatic proptosis in free roaming non-descript dogs.

Among the various ocular diseases, retinal detachment and retinal degeneration contributed 14.79% and 13.71%, respectively. Labrador retrievers had the highest incidence of retinal detachment (55.21%), followed by non-descript dogs (11.46%) and Spitz (10.42%). Foote *et al.* (2018)

also reported the increased incidence of retinal detachment in Labrador Retrievers, Schnauzers, Shih Tzus, Boston Terriers, Poodles, Jack Russell Terriers, Italian Greyhounds, and Yorkshire Terriers. Spitz had the highest percentage of retinal degeneration (25.84%), followed by non-descript dogs (26.67%) where Freitas *et al.* (2021) reported higher incidence in Poodles (20.00%).

In the present study, 7.86% of amaurosis cases were documented whereas Tamilmahan *et al.* (2013) had reported only 4.5% incidence of amaurosis in dogs.

Lens luxation constituted 3.08% and it was also observed that non-descript dogs (2%) were more likely to develop lens luxation than Labrador retriever (20%) and Spitz (20%) with high incidence at five years (n=4) of age, followed by 9 years and 13 years. At odds with this, Sandmeyer *et al.* (2011) reported that terrier breeds were prone to lens displacement which was idiopathic in origin and developed in elderly dogs, reflecting age-related zonular degeneration.

There were four cases (26.67%) of glaucoma in Non-descript dogs, three cases (20 %) in Labrador Retriever, and two cases each in Pug (13.33%) and Rajapalayam (13.33%). Soundarya *et al.* (2020) also reported higher incidence in non-descript dogs. In 35 cases of hyphema, non-descript dogs (n=12) accounted for 51.43%, followed by Labrador Retrievers at 14.29%. Of the 44 cases of panophthalmitis identified, 31.82% was found in both Pug (n=14) and non-descript dog (n=14).

Incidence of intraocular tumours (1.23%) and retrolbulbar tumours (0.92%) were less during the period of study. Ota Kuroki *et al.* (2014) also reported that ocular tumors are uncommon in companion animals, with an affected rate of 0.87% of all dogs and 0.34% of all cats over a 10-year period. Intraocular tumour types reported in our study were lymphoma (%), melanoma (%), squamous cell carcinoma (%) and TVT (%).

According to North and Banks (2009), in 23 dogs with confirmed orbital neoplasia, 91% of the tumours were malignant and 74% were primary neoplasms. Eleven tumour types of connective tissue, bone, epithelial and haemolymphatic origin were represented. Dogs most typically affected were purebred, female and middle aged. Contrary to this, no breed or sex predisposition was noticed regarding the incidence of ocular tumours in the present study and it was in accordance with the findings of Attali *et al.* (2001).

Age-wise incidence of ophthalmic diseases: The highest incidence of exophthalmous (n=3) was seen in the age group of three to four years at 21.43% followed by less than one year at 14.29%. Enophthalmous (n=3) was observed in one dog each in the category of 6-12 months, one year and seven years. Anophthalmia was seen in three cases less than six months of age.

Proptosis (n=95) was most prevalent in age group less than six months (23.16%), followed by one year (20%), two years (16.84%) and three years (11.58%). Amaurosis (n=51) was most frequently seen in age group less than

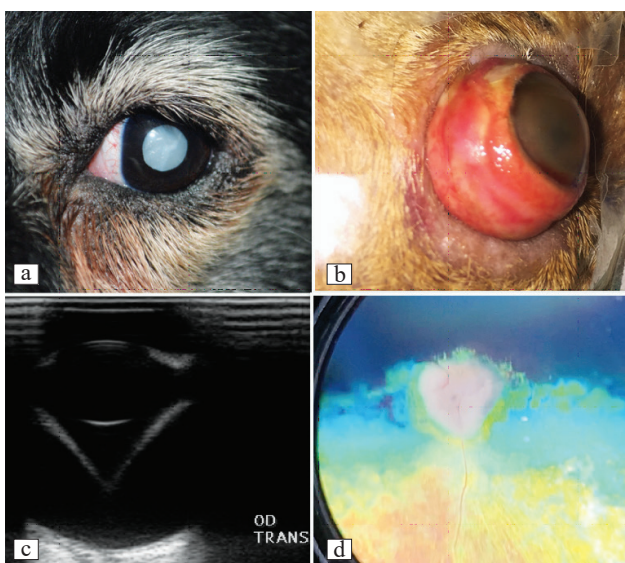


Fig. 1. (a) Cataract, (b) Proptosis, (c) Retinal detachment and (d) Retinal degeneration.

six months (19.61%) and two years (13.73%). Hyphema (n=35) was reported mostly at five years of age (20%) followed by seven years (14.29%). Glaucoma (n=15) was most frequent at one and ten years of age with three cases each representing 20%. Panophthalmitis had highest incidence at 18.18% in less than 6 months of age (n=8), followed by 15.91% at 3 years (n=7) and 7 years (n=7).

Highest incidence of cataract was reported at 8 years of age (12.35%) followed by 1-6 years of age group. Lens luxation was most prevalent at 20% in five years (n=4) of age, followed by 9 years and 13 years with three cases each in this age group.

Retinal degeneration was most common at nine years (n=16) of age, i.e. 17.98% followed by 14.61% (n=13) at six years of age. Retinal detachment was more frequent at four years (17.71%) and six years (16.67%) of age.

Intraocular tumours (n=8) occurred more frequently within the age of 5-6 years with 2 cases each (25%), followed by 8-10 years with one case each (12.5%). Of the six cases of retrobulbar tumours identified, 33.33% (n=2) was recorded in nine and eleven years of age and 16.67% (n=1) at two and five years of age.

Sex-wise incidence of ophthalmic diseases: With respect to this study, among the various ophthalmic disorders, male dogs had higher incidence of exophthalmos (57.14%), anophthalmia (66.67%), proptosis (66.32%), cataract (54.71%), lens luxation (60%), retinal detachment (56.25%), panophthalmitis (61.36%), intraocular tumour (62.5%) and retrobulbar tumour (100%). Female dogs had highest incidence with respect to enophthalmos (66.67%), amaurosis (56.86%), hyphema (51.43%), glaucoma (53.33%) and retinal degeneration (52.81%).

This study would serve as a good reference for incidence of various ophthalmic disorders like exophthalmos, enophthalmos, anophthalmia, proptosis, amaurosis, hyphema, cataract, lens luxation, retinal degeneration, retinal detachment, panophthalmitis, intraocular tumour and retrobulbar tumours.

SUMMARY

A total of 14,747 dogs were presented to Small Animal Ophthalmology unit of Madras Veterinary College Teaching Hospital for different ophthalmic diseases during the period of 2018 to 2021. Out of which, 649 (4.4%) dogs had less common intraocular and orbital diseases. The remaining 14,098 (95.6%) dogs had only corneal and extraocular diseases which were not included in this incidence study. The incidence was higher with cataract (n=170, 26.19%),

followed by retinal detachment (n=96, 14.79%), proptosis (n=95, 14.64%) and retinal degeneration (n=89, 13.71%). Apart from these, incidence of eyeball lesions like exophthalmos was 2.16% (n=14), enophthalmos 0.46% (n=3) and anophthalmia 0.46% (n=3). The incidence of amaurosis was 7.86% (n=51), hyphema 5.39% (n=35), lens luxation 3.08% (n=20), glaucoma 2.31% (n=15) and panophthalmitis 6.78% (n=44). Incidence of intraocular tumours 1.23% (n=8) and retrobulbar tumours was 0.92% (n=6).

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