

OCULAR AFFECTIONS IN DOGS

Vivek Malik¹ and R.P. Pandey²

¹Assistant Professor, ²Professor & Head, Department of Surgery & Radiology, College of Veterinary Science & A.H.; U.P. Pandit Deen Dayal Upadhyay Pashu-Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan (DUVASU), Mathura-281001 (Uttar Pradesh).

[Received: 25.05.2020; Accepted: 22.07.2021]

{DOI 10.29005/IJCP.2021.13.2.63-70}

The study was conducted to evaluate the clinical and sonographic findings for diagnosis and management of different ocular affections. A total of 37 cases were presented with complaints of different types of ocular affections during the study period. The study revealed the incidence of different ocular affections in dogs of different breeds: cataract (22%), corneal opacity (19%), cherry eye (13%), trauma (8%), and proptosis (8%). The incidence of each affection viz., descemetocoele, traumatic lens expulsion, and pigmentary keratopathy was (5%) whereas, the incidence percentage of glaucoma, anterior uveitis, dermoid, corneal ulcer, and prolapse of iris was (3%) for each affection. The reported cases were diagnosed clinically and ultrasonographically and treated by medicinal, surgical, or medico-surgical interventions as per the requirements.

Keywords: Dogs, Ocular affections, Ultrasonography.

Ultrasonography is indicated in diagnosing alterations that are not identified in the routine ophthalmic examination, especially when there is opacification of the transparent media of the eye (cornea, aqueous humor, lens, and vitreous humor (Gonçalves *et al.*, 2000). The ultrasound frequency used in ocular diagnostics usually ranges from 7.5 to 50 MHz. In veterinary ophthalmology, B-mode ultrasonography provides a two-dimensional real-time image and is the most common mode of ultrasonography used for the evaluation of intraocular and orbital structures. It is a two-dimensional imaging technique used to determine anatomical standards and pathological alterations, especially when ocular and intraocular opacities prevent the assessment of the posterior segment of the eye. Ocular ultrasound can be potentially useful to the emergency physician in several conditions like lens dislocation, globe rupture, and retrobulbar haemorrhage (Blaivas, 2000), blunt trauma to the eye when there is considerable soft-tissue swelling that can make it difficult to retract the eye lids (Rosen, 1997). Other applications include evaluation of the eye with new-onset visual change, such as that in retinal detachment or central retinal artery or vein occlusion. The present investigation aimed to evaluate the importance of ultrasonography for diagnosis

and management of different ocular affections in canines.

Materials and Methods

A total of 37 dogs, irrespective of age, sex, and breed, suffering from different ocular affections were included in the present study. After recording the detailed history of the case, all animals underwent thorough clinical, ophthalmological, and ocular ultrasonographic examinations to arrive at a confirmatory diagnosis. An ultrasonographic examination was carried out after proper restraining of the animal with or without any sedation, anesthesia, or local anaesthetic application in sternal recumbency. The trans-corneal method of scanning was used to produce the highest quality image. To avoid trapping air between the transducer and the patient, the palpebral hairs were thoroughly wet before the coupling gel was applied. The probe was gently applied over the cornea after the application of an ample amount of sterile coupling gel, positioning the lateral canthus of the eye to the left of the screen and the medial canthus to the right.

All attempts were made not to put excessive pressure on the cornea during placement of the transducer to avoid deforming the globe. The globe was imaged in both horizontal and vertical planes through the visual axis on the cornea. After completion of the procedure, the eyes were rinsed off with normal saline solution to

remove the coupling gel, followed by the instillation of four drops of tobramycin-containing eye drop. These cases were treated by medicinal, surgical, or medico-surgical interventions as per the requirements.

Results and Discussion

Corneal opacity

In the present study, seven cases (19%) were presented with corneal opacity in different breeds of dogs. In all the cases of dogs presented with corneal opacity, common clinical findings were epiphora, blepharospasm, ocular discharge, photophobia, and pain (Fig. 4). Similar symptoms have also been observed by Uike *et al.* (2016). Ultrasonographic examinations

of the eyes showed hyper-echoic areas on the cornea and anterior lens capsule with otherwise normal echo-morphology. After making the confirmatory diagnosis, the animals were treated with inj. Triamcinolone 0.2 mL and inj. Gentamicin 0.2 mL (subconjunctivally) weekly for up to three weeks. Simultaneous topical instillation of Tobramycin, prednisolone acetate 1% eye drop, and cyclosporine B ointment for seven days was also advised. All the cases affected by corneal opacity recovered successfully after two weeks. The treatment given for corneal study, i.e., eye drops ofloxacin, corticosteroid (1% prednisolone), and ointment cyclosporine, was similar to that recommended by Uike *et al.* (2016) also.



Fig 4. A male Labrador retriever showing a milky white cornea, i.e., corneal opacity (A) and a sonogram showing a hyper-echoic area on the anterior lens capsule with normal echo-morphology (B).

Corneo-conjunctival dermoid in a dog

One case (3%) of dermoid was reported in the present study, which was in a seven-month-old female Labrador with a history of congenital dermoid in her left eye (Fig. 5). Clinical findings in this case were epiphora, keratoconjunctivitis, and cutaneous outgrowths with hair clusters at 3 o'clock to 5 o'clock positions on the lateral side of the left eye. Growing hairs from the lesions are responsible for persistent irritation, chronic inflammation of the conjunctiva and cornea, and visual impairment as also mentioned by Barkyoumb and Leipold, 1984. In that case,

sonography showed normal echo-morphology with hyper-echoic structure at varying places, showing dermoid mass in the eye. Surgical excision of the dermoid mass was performed in general anaesthesia by superficial keratectomy and conjunctivectomy. Temporary tarsorrhaphy was done in each case, and the sutures were removed after a week. Eyedrop Tobramycin was instilled six times a day for the next 14 days postoperatively. Intra-muscular inj. cefotaxime 250 mg and inj. meloxicam were injected once a day for 5 days post operatively.

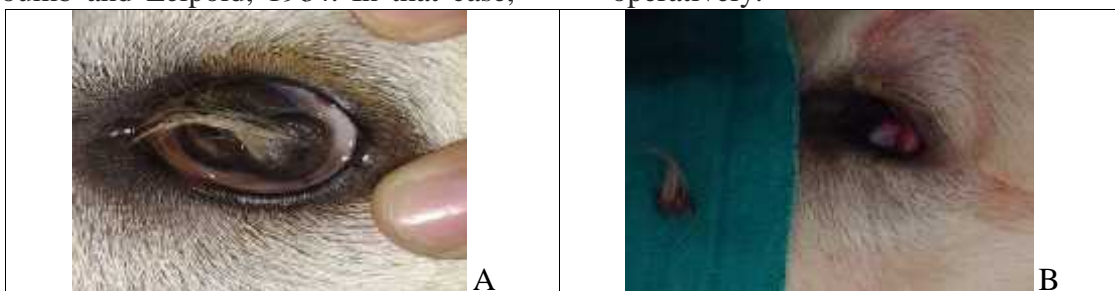


Fig. 5: Corneo-conjunctival dermoid in a female Labrador dog (A) and postoperative image with excised dermoid mass (B)

Cherry eye

In five cases (13%) of the present study, which included dogs from each breed, viz., Lhasa apso, Beagle, and Saint Bernard, and two Rottweiler dogs (Fig. 6). In all cases,

bilateral prolapse of the third eyelid was noticed. The ultrasonographic examination of the eyes of the animals showed a hyper-echoic mass adjacent to the eyeball, showing hypertrophy of the nictitating membrane.



Fig. 6: Prolapse of third eyelid in Beagle breed dog "cherry eye" (A) and sonogram showing hyper-echoic mass at left side of picture adjacent to ciliary body showing third eyelid hypertrophy, intraocular echomorphology is normal (B).



Fig. 7: Reposition of the gland in the pocket (A) and post-operative image (B)

The pocket technique in these patients was performed (Fig.7). It was advised to instil eye drops with Tobramycin qid in both eyes for 7 days. The technique of surgical repositioning in the present cases (similar to the conjunctival pocket technique/Morgan technique) was simple to perform and carried a greater success rate with fewer complications than other treatment options. As a result, this procedure can be used instead of removing the third eyelid gland without causing damage to the gland's duct system.

Cataract

Cataracts were reported in eight (22%) animals in the present study, in Spitz, German shepherd, Labrador, and Mongrel breeds (Fig 8-13). Clinical and ophthalmic examinations

showed varying degrees of blindness and lens opacity. Sonographic examination revealed different findings as indicated in fig. 11-13. Underlying causes of cataract may include genetic mutations, diabetes mellitus, uveitis, congenital anomalies, trauma, toxins, and dietary deficiency also reported by Davidson and Nelms, 2007. In one case, small incision cataract surgery (SICS) was performed by creating a palpebral tunnel. In the remaining seven cases of dogs affected by cataracts, their owners did not show any interest in correcting the cataract surgically. Out of seven cases, one case of cataract was of diabetic cataract. The age of the dog was 6 years and the blood glucose was 185 mg/lit. One case of juvenile cataract was found in a 1.5-year-old male German shepherd dog.



Fig. 11: Hyper-echoic rim around the lens and echogenically enhanced nucleus, which is asymmetric but nearly complete.



Fig. 12: Hyper-echoic lines in the lens capsule which do not occupy the entire lens parenchyma (immature cataract)



Fig. 13: Hyperechoic margins of the lens capsular rim with hyperechoic zones in the lens indicating hyper-mature cataract

Prolapse of iris

Prolapse of the iris was reported in one (3%) case, in Spitz. A seven-month-old female Spitz with a history of trauma in her left eye from a sharp object one day ago was presented. The clinical examination of the left eye revealed blepharospasm, epiphora, and a prolapse of a light brown mass through the middle part of the cornea. An ophthalmic examination revealed a distorted cornea with corneal edema and a blood clot at the lacerated site. Ultrasonographic evaluation of the eye in this case showed hyperechoic shadows, indicating haemorrhages. After putting the animal under general anesthesia, the periocular area was carefully clipped and scrubbed with povidone iodine solution. The corneal and conjunctival surfaces were irrigated with isotonic normal saline solution, and the periocular area was painted with povidone iodine solution. The dog was positioned in right lateral recumbency with the affected eye placed upward. The adhesions between the protruded iris and the cornea were gently separated, and the iris mass excision was done using a #11 BP blade. After cleaning the debris edges of the corneal wound, they were grasped with Colibri forceps and were opposed by simple interrupted sutures using No. 6-0 vicryl to repair the cornea completely, and temporary

tarsorrhaphy was done. Postoperatively, an eyedrop of Tobramycin qid with systemic tab. Cefuroxime 100 mg od for 5 days and inj. meloxicam 1 ml (i/m) for 3 days were advised.

Pigmentary keratitis

Pigmentary keratitis was reported in 2 (5%) cases in the pug breed of dog. A male pug of age three years was reported with a history of dryness in the right eye and bulging of the eyeball (Fig. 14). The owner also reported that the animal keeps his eyelids partially closed while sleeping. On clinical examination, the colour of the sclera and cornea were changed, i.e., from reddish brown to brown, with reduced tear production and low grade corneal inflammation also present. Sonogram showed hyper - echoic area around anterior lens capsule and cornea. The case was treated successfully with topical oint. cyclosporine bid for a week, topical eye drop carboxymethyl cellulose sodium tid for one week, eye drop prednisolone 1%, and tab Acetazolamide 25mg sid for five days was advised. Both cases showed very good responses after 5 days of treatment. Similar treatment was advised for other cases also. Most of the pigment deposits vanished 5–15 days after cryosurgery.

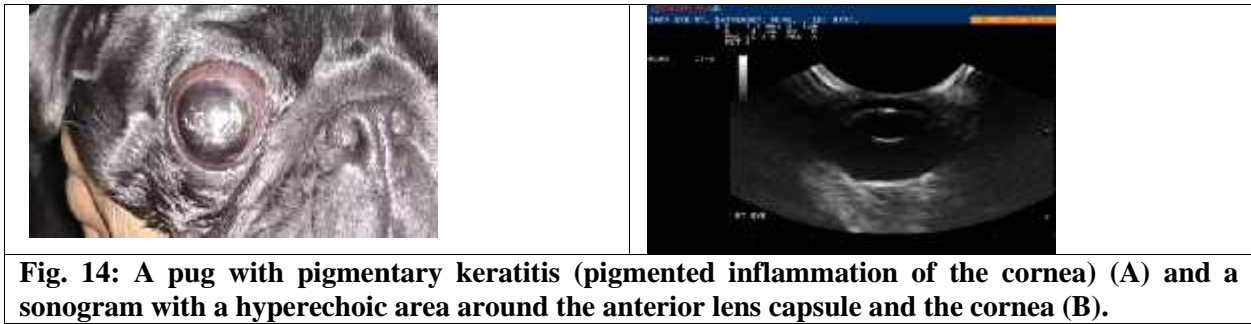


Fig. 14: A pug with pigmentary keratitis (pigmented inflammation of the cornea) (A) and a sonogram with a hyperechoic area around the anterior lens capsule and the cornea (B).

Glaucoma

Glaucoma was reported in one (3%) case of a female pug of 3.5 years of age (Fig. 15). The dog was presented with a history of uneasiness, epiphora, blepharospasm, and episcleral congestion in the right eye since one week, as also reported by Gelatt *et al.* (2007). Clinical examination revealed an enlarged globe, corneal oedema, dilated pupil, and peripheral corneal vascularization in the affected eye. Dogs may also be presented without vision, lacking menace responses,

pupillary light reflexes (PLRs), and dazzle reflexes, similarly mentioned by Grozdani (2007). Ultrasonographic examination showed hyperechogenicity over the anterior lens capsule with otherwise normal intraocular morphology. The case was treated successfully using tab acetazolamide 25 mg for two weeks, inj. meloxicam 0.5 ml (i/m) for five days, eye drop pilocarpine tid for five days, and oint. visiocare bid for one week was advised.

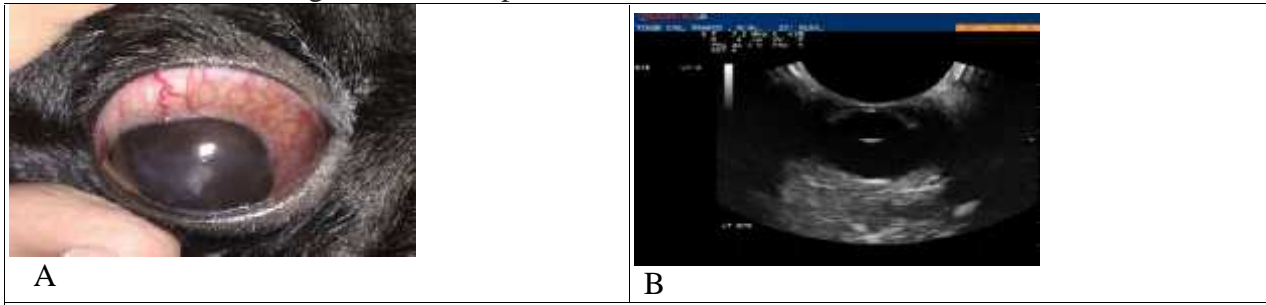


Fig. 15: A Pug showing bulging of the eye ball, i.e., glaucoma (A) and an ultrasonogram showing normal intraocular echo-morphology (B).

Descemetocele

Descemetocele was reported in two cases (5%) in the pug breed of dog. A two-year-old male pug with a history of suspected traumatic injury with epiphora, blepharospasm, and photophobia was reported (Fig. 16). Clinical examination revealed corneal oedema and a deep-seated corneal ulcer. Sonogram showed a diminished anterior lens capsule and an irregular pattern

of the cornea. The animal was successfully treated with temporary tarsorrhaphy along with topical instillation of eye drop moxifloxacin qid for 7 days, eye drop Nepafenac tid for 7 days, tab Cefuroxime 125 mg bid for 4 days, and tab Carprofen 25 mg sid for 3 days was advised. A similar way of treating glaucoma was advised for the remaining cases also. Both cases showed significant improvement after 7 days of treatment.

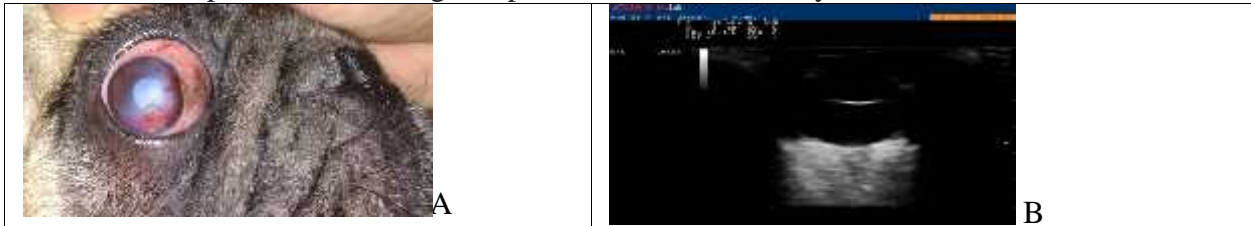


Fig. 16: A pug showing an advanced stage of corneal ulcer "descematocele (A)" and a sonogram showing a diminished anterior lens capsule and an irregular pattern of the cornea.

Traumatic lens expulsion

Two (5%) cases of traumatic lens expulsion were reported, one in a pug and one in a mongrel dog. A male pug of 2.5 years was reported in the clinic with a history of trauma which had led to ocular lens expulsion. The clinical examination of the eye showed trauma with haemorrhage in the eye. The ultrasonographic examination of the eye showed the absence of the lens in the eye. Under sedation, temporary tarsorrhaphy was done. Tab. Cefuroxime 250 mg bid for 5 days and tab Carprofen 25 mg sid for 7 days were advised. The animal showed good recovery after suture removal one week later.

Traumatic proptosis with vitreal haemorrhage

Traumatic proptosis was reported in three (8%) cases, of which one was a pug and two were mongrel dogs (Fig 17-19). A four-year-old male pug was presented with a history of dog fights which resulted in forward displacement of the right eye globe. A clinical examination revealed that the right eye was proptosed with a miotic pupil. There was no direct or consensual pupillary light reflex. The ultrasonographic examination of the eye showed diffuse, multifocal, evenly dispersed echoes in the vitreal chamber with

motion on real-time examination, suggesting vitreal haemorrhage with no other alteration in intraocular morphology. The proptosed globe was cleaned with gauge pads soaked in normal saline. After putting the animal under general anesthesia, the periocular area was carefully scrubbed with povidone iodine solution. An incision was made in the outer edge of the eye lid to allow more space for the eye to be replaced in the bony socket. Then the eye was replaced in the socket and a temporary tarsorrhaphy was done. A small gap was left at the medial canthus for administration of topical ophthalmic medications. Post-operatively, tab Cefuroxime 250 mg sid for 7 days and tab Carprofen 25 mg sid for 5 days were advised. Sutures were removed after 12 days and there was an uneventful recovery, but the dog could not regain its vision.

A similar case was reported in a six-month-old Mongrel dog and was treated as above. Another case of a male mongrel dog of 14 years with bilateral proptosis because of accidental trauma was reported in the clinic. No further treatment was given to the animal because of the owner’s willingness to euthanize the dog. Therefore, after the owner’s agreement, the dog was ethically euthanized.



Fig. 17: Traumatic proptosis

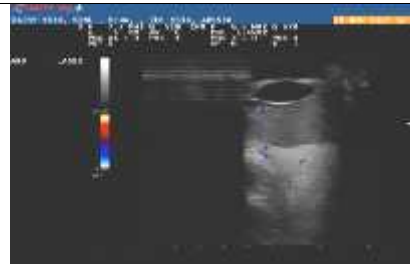


Fig. 18: Vitreous haemorrhage with intact retina (Diffuse, multifocal, evenly dispersed echoes in the vitreal chamber with motion on real-time examination suggesting vitreal hemorrhage)



Fig 19. Bilateral proptosis associated with head trauma in a mongrel dog (A) and sonogram showing hyper-echoic structures indicating severe intraocular hemorrhage around the lens and ciliary body (B)

Traumatic proptosis with linear retinal detachment:

Linear retinal detachment was reported in an adult pug affected with traumatic proptosis of the left eye ball after a dog fight (Fig. 20). Ultrasonography revealed linear retinal detachment with otherwise normal intraocular structures. Canthotomy and temporary tarsorrhaphy was performed after

reposition of eye ball in the socket. Post-operatively tab Cefuroxime 250 mg sid for 7 days, tab Carprofen 25 mg sid for 5 days were advised. Topical eye drop Moxifloxacin qid for 7 days and eye drop Nepafenac bid for 7 days were also advised similar to Sagar *et al.* (2016). Sutures were removed after 12 days and there was uneventful recovery, but dog could not regain its vision.



Fig. 20 Traumatic proptosis (A) and linear retinal detachment (B)

The data was analyzed, based on the affections of eye and disease conditions in different breed, age, sex of the animals in present study, similar to reports published by Akinrinmade and Ogungbenro (2015). In present study, breed distribution revealed that pug was the most commonly affected breed with ocular affections. In the present study highest incidence of ocular affections found in dogs of less than five years of age.

Sex wise incidence of ocular affections in dogs showed that male dogs had higher occurrence than female dogs. Similar finding

has been reported by Tamilmahan *et al.*(2013); Arafat *et al.*(2016) Animals presented with ocular affections were also analyzed depending on the side of the eye affected i.e., right, left or both. This showed highest incidence of animals presented with bilateral ocular affections (52%), followed by left eye affections (35%). Lowest incidence (13%) was noticed in the animals affected with right eye oculopathies (Fig 1,2 &3). Various ocular affections with diagnosis and treatment, which were studied in the present study are summarized as below.

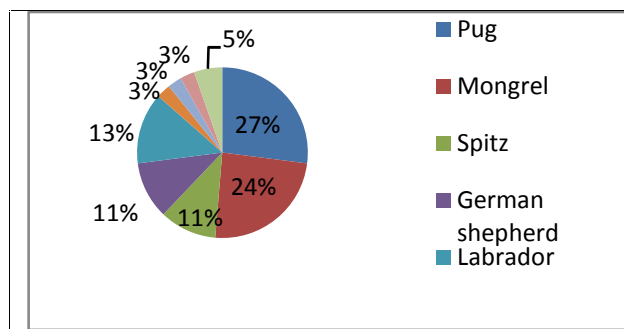


Fig. 1: Diagram showing the hospital incidence of ocular affections in different breeds of dogs

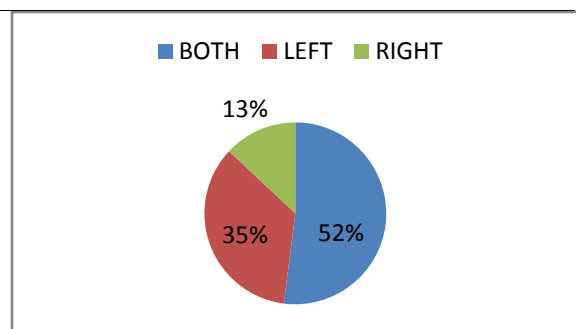


Fig. 2: Diagram showing the distribution of ocular affections on the basis of eye in the total number of animals.

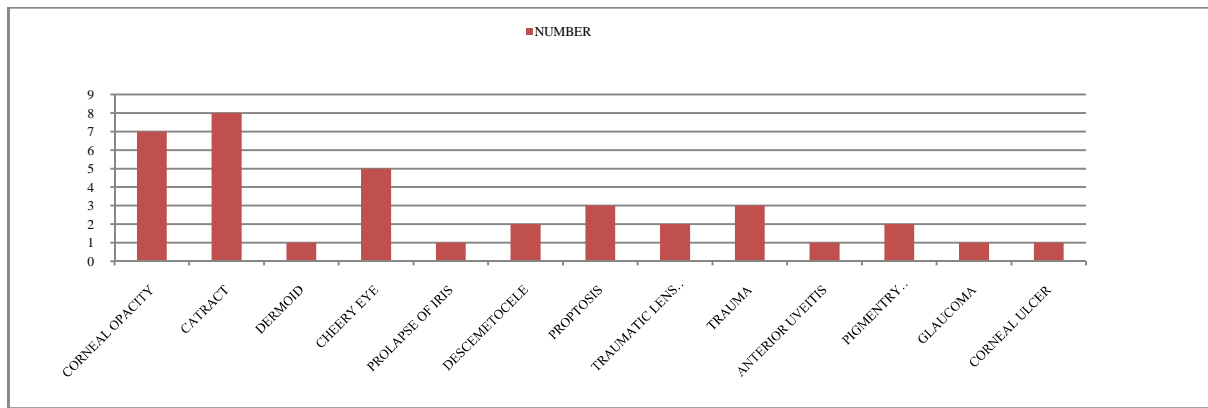


Figure 3: A diagram depicting the distribution of ocular affections by affected eye in the total number of animals.

Acknowledgement

Financial help to conduct this study provided by the Indian Council of Agricultural Research (ICAR) as "All India Network Programme on Diagnostic Imaging and Management of Surgical Conditions in Animals (AINP-DIMSCA)" is duly acknowledged.

References

- Akinrinmade, J.F. and Ogungbenro, O.I. (2015). Incidence, diagnosis and management of eye affections in dogs. *Sokoto J. Vet. Sci.*, **13** (3): 9-13.
- Arafat, I., Gupta, A.K., Bhadwal, M.S. and Soodan, J.S. (2016). Occurrence of ocular affection in farm and companion animals. *Intas polivet*, **17** (2):336-338.
- Barkyoumb, S.D. and Leipold, H.W. (1984). Nature and cause of bilateral ocular dermoids in Hereford cattle. *Vet. Pathol.*, **21**(3): 316-324.
- Berford, P.G.C. (1977). The surgical treatment of canine glaucoma. *J. Small Anim. Pract.*, **18**: 713-730.
- Blaivas, M. (2000). Bedside emergency department ultrasonography in the evaluation of ocular pathology. *Acad. Emerg. Med.*, **7**: 947-50.
- Davidson, M.G. and Nelms, S.R. (2007). Diseases of the lens and cataract formation. In: Gelatt K.N. *Veterinary Ophthalmology*. Iowa: Blackwell Publishing, **2**: 862-881.
- Gelatt, K.N., Brooks, D.E. and Kallberg, M.E. (2007). The canine glaucomas. In: Gelatt, K.N., ed. *Veterinary Ophthalmology*. 4th edn. Ames, Iowa: Blackwell publishing. Pp: 53-81.
- Gonçalves, G.F., Pippi, N.L., Raiser, A.G., Mazzanti, A., Oliveira, S.T., Neves, J.P., Leotte, A.M. and Hintz, C.W. (2000). Biometria ultra-sonografica bidimensional em tempo real do globo ocular de caes. *Ciencia Rural*, **30** (3): 417-420.
- Grozdanic, S.D., Matic, M., Betts, D.M., Sakaguchi, D.S. and Kardon, R.H. (2007). Recovery of canine retina and optic nerve function after acute elevation of intraocular pressure: Implications for canine glaucoma treatment. *Vet. Ophthalmol*, **10**: 101-7.
- Rosen, P. (1997). *Emergency Medicine Concepts and Clinical Practice*, 4th edn., St. Louis: Mosby. Pp. 2243-2245.
- Sagar, R.S., Maruti, S.T. and George, A. (2016). Surgical Management of traumatic proptosis in a pug. *Intas Polivet* **17** (2): 376-377.
- Tamilman, P., Zama, M.M.S., Pathak, R., Muneeswaran, N.S. and Karthik, K. (2013). A retrospective study of ocular occurrence in domestic animals: 799 cases. *Vet. World*, **6**(5): 274-276.
- Uike, V.A., Jadhao, P.T., Upadhye, S.P. Saivekar, S.P. (2016). Clinical management of corneal opacity-A study of 11 dogs. *Intas Polivet*, **17**(2): 383-385.