www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; SP-10(11): 778-780

www.thepharmajournal.com
Received: 07-09-2021
Accepted: 09-10-2021

Apra Shahi
Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, India

Apoorva Mishra
Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, India

Babita Das
Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, India

Shobha Jawre
Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, India

Randhir Singh
Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, India

Corresponding Author
Apra Shahi
Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, India

B-scan ultra sonographic diagnosis of ophthalmic disorders in dogs

Apra Shahi, Apoorva Mishra, Babita Das, Shobha Jawre and Randhir Singh

Abstract
Ultrasonography is a non-invasive diagnostic imaging procedure that uses sound waves to capture images of interior eye. Direct visualization of intraocular structures is difficult or impossible when eyelids are swollen shut after injury. Moreover, lens opacification and hyphema can also block the posterior view of the chamber. Twenty dogs presented at TVCC, Jabalpur, suffering with ephiphora, decreased visual acuity and failed obstacle course test were evaluated with routine ophthalmological examination and B mode ultrasound scan of both the eyes to reveal vision threatening conditions such as pigmentary keratitis, various grades of cataract, lens luxation, vitritis and retinal detachment. Typical ultrasound images showed complete reflection of sound wave from corneal surface in case of pigmentary keratitis, hyperechoic lens capsule and lens in cataract, luxated hyperechoic lens lying in hypoechoic vitreous humor, hyperechoic foci in anechoic vitreous in case of vitritis and finally sea gull appearance of retina in case of retinal detachment. Therefore it can be concluded that ultrasonography is an effective diagnostic tool along with the ophthalmoscopy to diagnose internal structures of eye.

Keywords: ocular abnormalities, B-scan ultrasonography, dog

Introduction
Ultrasonography is an efficacious non-invasive diagnostic imaging procedure that uses sound waves to capture images of interior eye. With an increasing use of two-dimensional ultrasound as a soft-tissue imaging modality in veterinary medicine, it has been applied in diagnosis of various ophthalmic disorders. Direct visualization of intraocular structures is difficult or impossible when eyelids are swollen shut after injury or in cases of lens opacification and hyphema which blocks the posterior view of the eye. Hence, B-mode ultrasonography is routine opthalmological examination and an indispensable step in preoperative evaluation of dogs with cataract since ophthalmoscopy is not feasible when there is opacification of the lens. The eyeball's fluid content and its superficial position makes it ideally suited for ultrasonography examination. Ocular ultrasound is practical and noninvasive technique for imaging the eye and is especially valuable for "seeing" retrobulbar and intraocular lesions when cloudy ocular media preclude their direct visualization (Fielding, 2001) [1]. Indications for diagnostic ultrasonography include localization of retinal detachments, intraocular and intraorbital tumors, foreign bodies, vitritis, asteroid hyalosis etc. (Aironi and Gandage, 2009) [2]. In the present work various conditions diagnosed by conventional B-scan ocular ultrasonography in the ophthalmic unit of the Department of Surgery and Radiology, NDVSU, Jabalpur, India during November 2019-August 2020 were studied.

Materials and Methods
60 dogs (120 eyes) both male and female of different breeds were presented with varying symptoms of ocular abnormalities. All the animals were subjected to detailed ophthalmic examination and B-scans of the eyes using a 7.5-18 MHz linear probe. The animals were scanned in sternal recumbency with head towards examiner. After topically anesthetizing the cornea with 4% lignocaine gel, the transducer was placed Trans corneally after the application of coupling gel (Dziezyc *et al*., 1987) [3]. Imaging through the eye lid was avoided because it produces artifacts and causes image degradation. All animals were scanned without sedation or general anesthesia as these methods cause eye ball to deviate medially and downward or the third eyelid to move upward making the imaging process troublesome. The transducer was moved slowly across the globe and angled in different directions to highlight various intraocular structures. Lesions were marked to delineate structures using in-built caliper.

The structures of the globe were evaluated to a depth of 4–6 cm. The retrobulbar region was evaluated at a scanning depth of 6–10 cm (Grainger *et al*., 2001) [4]. Ocular abnormalities were evaluated in respect to location (i.e., anterior/posterior segment) and echo texture (isoechoic or hypo/hyper-echoic) compared to the surrounding tissues. Eyes were rinsed with saline solution after each examination and a drop of lubricant hydoxymethypropyl cellulose was instilled.

Results and Discussion

In the present study, 60 dogs (120 eyes) were scanned by ultrasonography. In each case, a representative sonogram using 7.5 MHz was obtained first. Various ocular conditions detected by B-scan ultrasonography included early cataract changes in 20 dogs, mature cataract in 10 dogs and hypermature condition in 8 cases, sub-luxation of lens in 1 dogs. Retinal detachments were seen in 4 dogs, while posterior vitreal degeneration and vitritis was seen in 5 and pigmentary keratitis in 12 dogs. Cataracts are degenerative changes in the lens (Gelatt and Mackay, 2005) which produce echogenicity at various locations within an anechoic lens. Echogenicity, size and shape of the lens may change with the type of cataract and its duration. Changes within a cataractous lens produce acoustic inhomogenecities (Spaulding, 2008) [6]. Dogs with early cataract (cortical) changes, had hyperechoic lines within the lens and the strong hyperechoic curvilinear line was a posterior specular reflection on the surface of the lens (Fig. 1). In cortical or mature cataracts, the anterior and posterior cortices were echogenic and the entire capsule was apparent (Fig. 2). In all cases of nuclear or hypermature cataract, the lens was hyperechoic with nucleus echogenically enhanced, and asymmetric echogenically enhanced with asymmetry, similar to the findings of Spaulding, 2008 [6] (Fig. 3).

Subluxated lens was identified in 1 dog where the hyperechoic cataracteous lens was seen lying posteriorly in the hypoechoic vitreal cavity (Fig 4). B-scan ultrasonography images of non-affected,contra-lateral eyes depicted three cavities with corneal surfaces as the first highly reflective lines (Boroffka *et al*., 2006) [7]. In normal eyes, the sclera, choroid and retina are adherent; however, under certain pathologic conditions, they may separate and form potential spaces (Spaulding, 2008) [6]. Similar to such findings, in our study dogs with complete retinal detachment, a typical "sea gull" apprearance in a longitudinal plane attached to the optic disc was visualized (Fig. 5). The retinal membrane was typically thicker and hyperechoic. It can be caused by vitreoretinal traction due to contracting membranes or by sub retinal exudates. Detached retinas produce a regular continuous sheet of high-amplitude echoes encroaching the vitreous cavity (McLeod *et al*., 1977) [8].

In pigmentary keratitis, partial or complete reflection of sound waves depending upon extent of pigmentation of the cornea was observed. In cases where the pigmentation covers complete cornea the posterior chambers cannot be demarcated and only the aperture of iris was appreciated (Fig. 6). Lastly, the vitreous is a transparent elastic hydrogel occupying 80% volume of canine eye. Vitreal degeneration or vitritis was seen as pointlike echoes of medium refractivity as discussed by Samuelson, 2007.

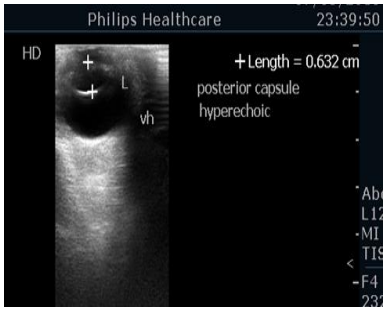

Fig 1: Ultrasonography image showing lens with thin hyperechoic lines indicating early cataract changes.

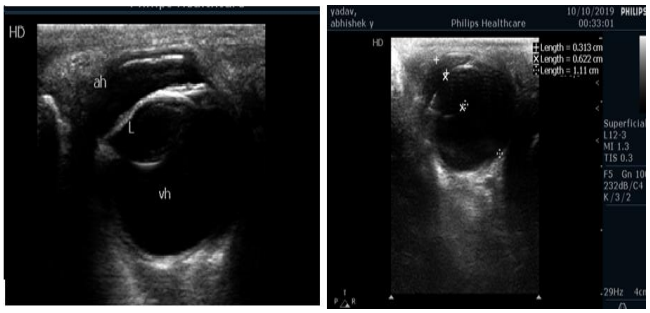

Fig 2: Ultrasonography image (7.5 MHz linear probe) showing hyperechoic rim around lens representing cortical or mature cataract. Focal hyperechoic area in lens represents incomplete cataractous involvement.

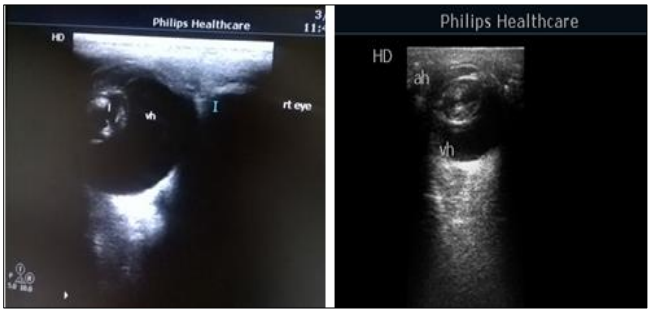

Fig 3: Ultrasonography image showing hyperechoic lens with nucleus echogenically enhanced, and asymmetric.

Fig 4: Subluxated hyperechoic cataractous lens lying posteriorly in the hypoechoic vitreal cavity

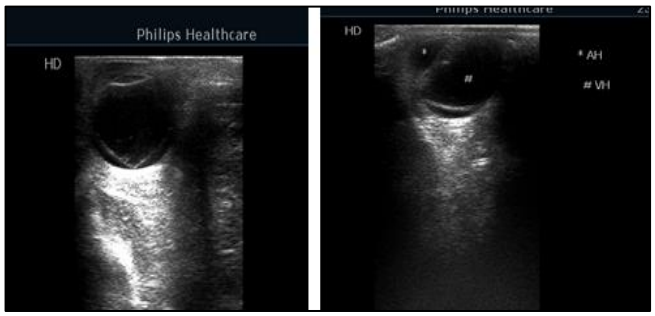

Fig 5: Ultrasonography image showing complete retinal detachment in a "sea gull" pattern coursing from their attachment at optic disc up to orra serrata.

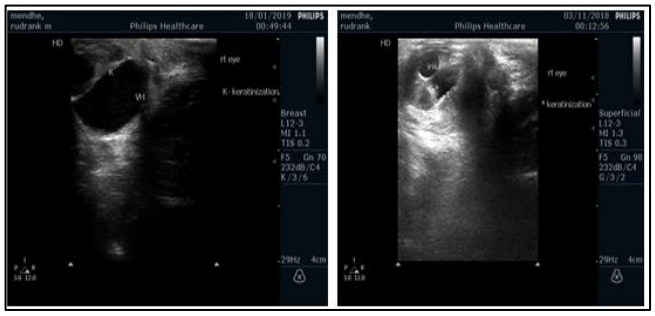

Fig 5: Ultrasonography image showing partial pigmentary keratitis in the former picture while the later shows complete pigmentary keratitis with appreciable iris detail

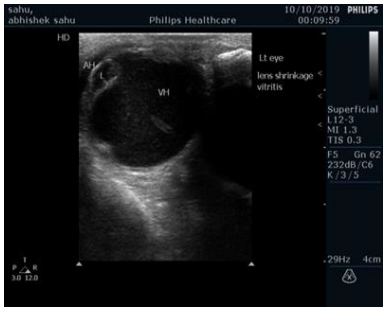

Fig 6: Hyperechoic foci in anechoic vitreous in case of vitritis

References

1. Fielding JA. The eye and orbit. In: Meire, H.B., Cosgrove, DO, Dewbury KC, Wilde, P. (Eds.), Clinical Ultrasound. (2nd Edn.), Edinburgh, Churchill Livingstone, 2001, 938-964.
2. Aironi VD, Gandage SG. Pictorial assay: B-scan ultrasonography in ocular abnormalities. Indian J Radiol Imaging 2009;19:109-115.
3. Dziezyc J, Hager DA, Millcaamp NJ. Two dimensional real time ocular ultrasonography in the diagnosis of ocular lesions in dogs. J Am. Anim. Hosp. Assoc 1987;23:501-508.
4. Grainger RG, Allison DJ, Adam A, Dixon AK. Grainger and Allison's diagnostic radiology. 4th Edn., Philadelphia, Churchill Livingstone 2001, 2605-2612.
5. Gelatt K, Mackay E. Prevalence of primary breed related cataracts in the dog in North America. Vet. Opthalmol 2005;8:101-111.
6. Spaulding K. Eye and orbit. In: Pennieck, D and d'Anjou, MA (Eds.), Atlas of small animal ultrasonography. (2nd Edn.), Iowa, Blackwell Publishing 2008, 49-89.
7. Boroffka SA, Voorhour G, Verbruggen AM, Teske E. Intraobserver and interobserver repeatability of ocular biometric measurements obtained by means of B-mode ultrasonography in dogs. American Journal of Veterinary Research 2006;67:1743-1749.
8. McLeod D, Restori M, Wright J. Rapid Bscanning of the vitreous. Bri. J. Ophthalmol 1977;61:437-445.
9. Samuelson D. Ophthalmic anatomy. In: Gelatt, KN (Ed.), Veterinary ophthalmology. (4th Edn.), Gainesville, Blackwell Publishing 2007, 37-149.