

## Computed tomographic finding of bilateral optic nerve head drusen in a dog – a case report

Chandrasekaran Niranjana<sup>1\*</sup>, Mohamed Shafiuza<sup>1</sup> and Ramani Chandrasekara Iyer<sup>2</sup>

<sup>1</sup>Department of Veterinary Surgery and Radiology, Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University, Chennai, India

<sup>2</sup>Department of Clinics, Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University, Chennai, India

---

**NIRANJANA, C., M. SHAFIUZAMA, R. C. IYER: Computed tomographic finding of bilateral optic nerve head drusen in a dog – a case report. Vet. arhiv 93, 491-494 2023.**

### ABSTRACT

Optic nerve head drusen are acellular calcified deposits in the optic nerve head reported in humans. A six year old, male, Rottweiler dog with a history of respiratory distress and epistaxis for the previous two months was anaesthetised and a computed tomographic scan of the head was performed. The axial view of the computed tomography scan with a slice thickness of 1mm was viewed in a soft tissue window (380x40 HU). There was an incidental discovery of a characteristic discrete round hyper dense area in the optic nerve head region in both eyes during the routine computed tomographic scan. The Hounsfield Unit of the optic nerve head drusen in the right eye measured 91 HU, of 2 mm<sup>2</sup> and in the left eye 131 HU of 1 mm<sup>2</sup> confirming the diagnosis of optic nerve head drusen. To the authors' knowledge, this is the first report of optic nerve head drusen in a dog.

**Key words:** optic nerve head drusen; calcification; hyperdense; computed tomography; dog

---

### Introduction

Optic nerve head drusen are calcified deposits located in the optic nerve head that are most commonly encountered in small, crowded optic discs. Optic nerve disc drusen (ONHD) have been reported in humans since 1966. They are often asymptomatic, but cause defects in the visual field (LORENTZEN, 1966). They are frequently missed in clinical tests, and visual function is not generally impaired early in infancy. Impairment of visual

acuity is rare but visual field defects are frequent (AUW-HAEDRICH et al., 2002). To detect buried drusen, computed tomography (CT) may be used. Due to their calcium concentration, drusen appear as bright white bodies on CT. A comprehensive CT scan, using thinner sections should be conducted to avoid missing tiny drusen (TUĞCU B and ÖZDEMİR, 2016). To the authors' knowledge, this is the first report of optic nerve head drusen in a dog.

---

\*Corresponding author:

Dr. Chandrasekaran Niranjana, Assistant Professor, Department of Veterinary Surgery and Radiology, Madras Veterinary College, Chennai -600007, Tamil Nadu, India, phone: +91-9884256715, e-mail: niranjana\_bvm@yahoo.com

### Materials and methods

A six year old, male Rottweiler dog was presented with a history of respiratory distress and epistaxis for the previous two months. Haematology revealed Hb-9.8%, PCV-27.5%, RBC-4.37%, platelet- 4.25 lakhs and relative neutrophilia (90%). Serum biochemistry revealed increased creatinine - 3.43 mg/dl. On examination there was dyspnoea and obstruction of the nasal passage. The menace response and dazzle and palpebral reflexes were intact in both the eyes. Direct and consensual pupillary light reflexes were normal. The eyelids, cornea, sclera and lenses were also normal in both the eyes. Intraocular pressure was 12mm Hg and 9mm Hg in the right and left eyes.

A computed tomography scan was performed using a third generation Toshiba Alexion 16-slice CT scanner. The dog was premedicated with butorphanol @ 2mg/ Kg BW, and diazepam @ 5mg/ Kg BW, induced with Propofol @ 3 mg/kg BW IV. An endotracheal tube was inserted and maintained with isoflurane @ 2-2.5%. The dog was positioned in sternal recumbency with collimation on the skull. Images of 1mm slice thickness were viewed in a soft tissue window (380x40 HU) using the Vitrea outstation software.

### Results

The axial view of the computed tomography scan showed obliteration of the right nasal cavity by soft tissue density which was diagnosed as nasal aspergillosis. Bilateral, discrete, round, hyper dense areas (Fig. 1) were visible in the posterior aspect of the eyeball. Such calcifications in the optic disc region in humans are termed optic nerve head drusen (ONHD). The optic nerve head drusen measured 91.0 HU in the right eye and 131.9 HU in the left eye (Fig. 2). Their horizontal and equatorial lengths were 24.6 mm and 23.0 mm for the right eye, and 22.7 mm and 20.5 mm for the left eye. The ocular structures and orbit were normal. The Hounsfield units of the anterior chamber, lens and posterior chamber were within normal limits. Fundus examination could not be performed as the dog was not co-operative and also had severe respiratory distress. Before further treatment or diagnostic tests were performed the dog died.



Fig. 1. Bilateral calcified deposits in the in the optic nerve head

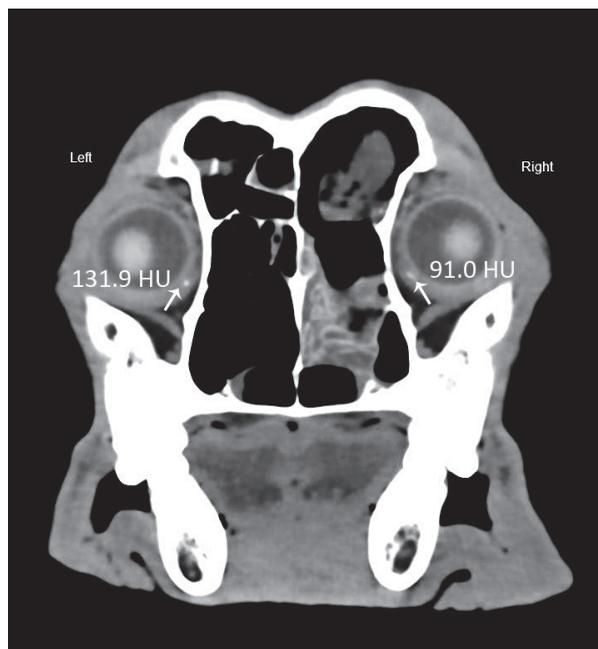


Fig. 2. Hounsfield unit measurement of Optic nerve head drusen (ONHD)

## Discussion

Optic nerve disc drusen (ONHD) are acellular calcium, amino and nucleic acid deposits, and mucopolysaccharides deposits (FRIEDMAN et al., 1977; TSO, 1981). These deposits cause vascular occlusion or anterior ischemic optic neuropathy, which leads to an acute reduction in vision (LEE and ZIMMERMAN, 2005). Some ONHD can be diagnosed by ophthalmoscopy as an optic disc elevation, blurred optic disc margins without obscuration of the peripapillary retinal vessels, but mostly they are deeply buried and are difficult to diagnose in this way (HAMANN et al., 2018). Two Labradors with similar optic disc lesions and halos around the optic disc were subjected to computed tomography but no hyperdense areas were detected by computed tomography. RAMIREZ et al. (1983) detected optic disc drusen as hyper dense spots consistent with calcification. Similar hyperdense spots as in this dog have been reported in humans by BIDOT and LAMIREL (2012) and WANG et al. (2018). In buried drusen, which may not be detectable by funduscopy, CT may be the only method of diagnosis (RAMIREZ et al., 1983). Further studies are needed to diagnose and treat such conditions in dogs.

## Conclusions

Hyperdense calcified deposits in the optic nerve head region cause impairment in the visual field. Future studies to follow disease activity in optic nerve disc drusen will necessitate more sensitive methods of documenting structural damage and functional impairments. Apart from ophthalmoscopy, we need to examine the optic disc with advanced imaging methods, such as computed tomography in dogs to confirm optic nerve head drusen.

## References

- AUW-HAEDRICH, C., F. STAUBACH, H. WITSCHEL (2002): Optic Disk Drusen. *Surv. Ophthalmol.* 47, 515-532.  
DOI: 10.1016/s0039-6257(02)00357-0
- BIDOT, S., C. LAMIREL (2012): Asymptomatic swollen optic discs and CT scan. *Neurol. Clin. Pract.* 2,165-166.  
DOI: 10.1212/CPJ.0b013e31825a61cc
- FRIEDMAN, A. H., B. BECKERMAN, D. H. GOLD, J. B. WALSH, S. GARTNER (1977): Drusen of the optic disc. *Surv. Ophthalmol.* 21, 373-390.  
DOI: 10.1016/0039-6257(77)90041-8
- HAMANN, S., L. MALMQVIST, F. COSTELLO (2018): Optic disc drusen: understanding an old problem from a new perspective. *Acta Ophthalmol.* 96, 673-684.  
DOI: 10.1111/aos.13748
- LEE, A. G., M. B. ZIMMERMAN (2005): The rate of visual field loss in optic nerve head drusen. *Am. J. Ophthalmol.* 139, 1062-1066.  
DOI: 10.1016/j.ajo.2005.01.020
- LORENTZEN, S. E. (1966): Drusen of the optic disk. A clinical and genetic study. *Acta Ophthalmol. (Copenh)* 90, S1-S180.
- RAMIREZ, H., E. S. BLATT, N. S. HIBRI (1983): Computed tomographic identification of calcified optic nerve drusen. *Radiology* 148, 137-139.  
DOI: 10.1148/radiology.148.1.6856823
- TSO, M.O. (1981): Pathology and pathogenesis of drusen of the optic nerve head. *Ophthalmology* 88, 1066-1080.  
DOI: 10.1016/s0161-6420(81)80038-3
- TUĞCU, B., H. ÖZDEMİR (2016): Imaging Methods in the Diagnosis of Optic Disc Drusen. *Turk. J. Ophthalmol.* 46, 232-236.  
DOI: 10.4274/tjo.66564
- WANG, D. D., J. C. Y. LEONG, J. GALE, A. P. WELLS (2018): Multimodal imaging of buried optic nerve head drusen. *Eye (Lond)* 32,1145-1146.  
DOI: 10.1038/s41433-017-0009-8

Received: 1 November 2021

Accepted: 30 September 2022

**NIRANJANA, C., M. SHAFIUZAMA, R. C. IYER: Kompjutorizirana tomografija bilateralne kalcifikacije optičkog živca u psa – prikaz slučaja. Vet. arhiv 93, 491-494 2023.**

#### **SAŽETAK**

Kalcifikacije optičkog živca su acelularne kalcificirane naslage koje se pojavljuju u ljudi. Pas pasmine rotvajler u dobi od šest godina, s anamnezom respiratornog distresa i epistakse u posljednja dva mjeseca, anesteziran je te je učinjena kompjutorizirana tomografija (CT) glave. CT snimka u aksijalnom prikazu debljine presjeka 1 mm prikazana je u mekotkivnom prozoru (380 x 40 HU). Rutinskim su CT snimanjem otkrivena diskretna okruglasta hiperdenzna područja u optičkom živcu oba oka. Kalcifikacija optičkog živca lijevog oka bila je veličine 91 HU i 2 x 2 mm, a lijevog oka 131 HU i 1 x 2 mm. Prema autorovim saznanjima ovo je prvi prikaz kalcifikacije optičkog živca u pasa.

**Ključne riječi:** optički živac; kalcifikacija; hiperdenzna promjena; kompjutorizirana tomografija; pas

---

