A Case of an Ocular Protothecosis in a Young Dog

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Introduction:
Protothecosis is a rare opportunistic algal disease in man and animals. *Prototheca spp.* are ubiquitous saprophytes in nature, predominantly found in water and sludge. They lack glucosamine and muramic acid in their cell walls in contrast to fungi and bacteria with asexual reproduction by endosporulation. In dogs enteral, cutaneous, ocular, spinal/cervical and disseminated visceral manifestations occur. In this particular case a canine ocular protothecosis is reported.

Literature:
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Case history:
An 11-month-old, intact male, Labrador Retriever dog was presented in good general condition with an effusion-caused retinal detachment and glaucoma in his right eye. The eye was surgically removed because of the glaucoma, fixed in formalin and processed for histopathological examination, stained hematoxylin-eosin (HE), Giemsa and periodic acid stain (PAS). The subretinal mass was composed of thin-walled, round to oval pathogens. To identify the agent, paraffin-embedded samples were therefore submitted to a mycological laboratory for PCR and sequence analysis and *Prototheca* was isolated. Examination of blood, faeces and urine after enucleation could not reveal algae. Unfortunately, no specific therapy was initiated. Four months after enucleation and a period without clinical symptoms, the dog had a relapse with development of a cutaneous nodule and affection of the second eye and was euthanised. No further pathological or laboratory exams were performed.

Fig. 1: Overview eye section on object slide. Note detached retina and thickened uvea posterior.

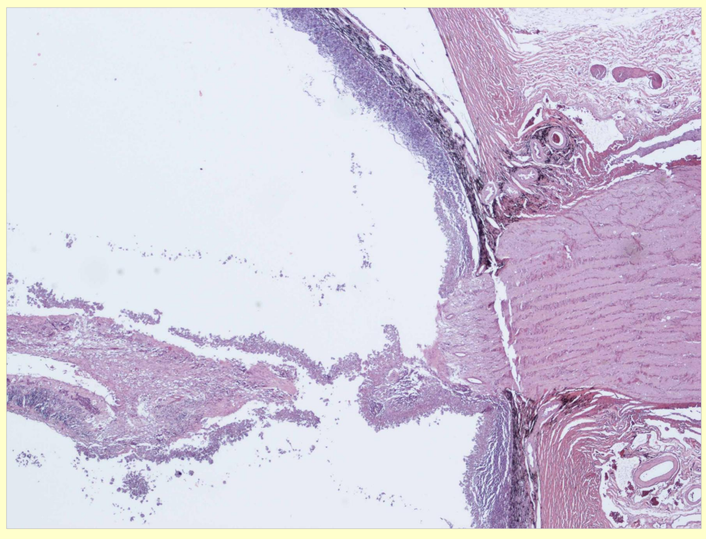

Fig. 2: Overview papilla/detached retina with massive cellular infiltrate, HE, 2x.

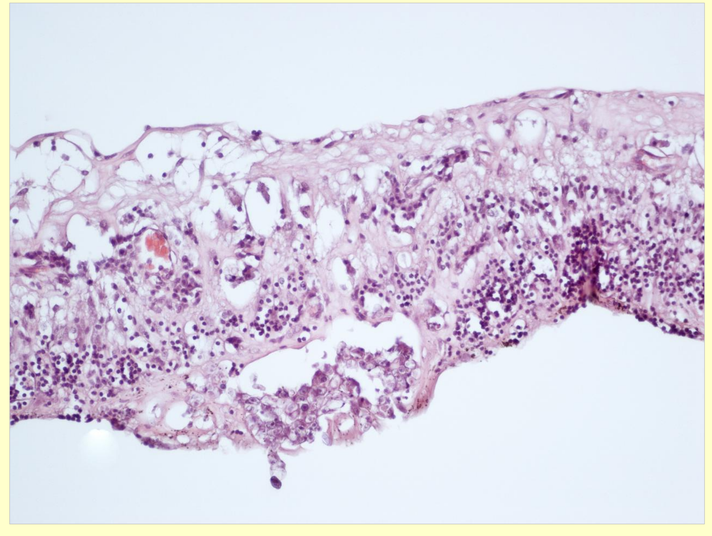

Fig. 3: Detached retina. Note group of oval pathogens at the base of retina, HE, 20x.

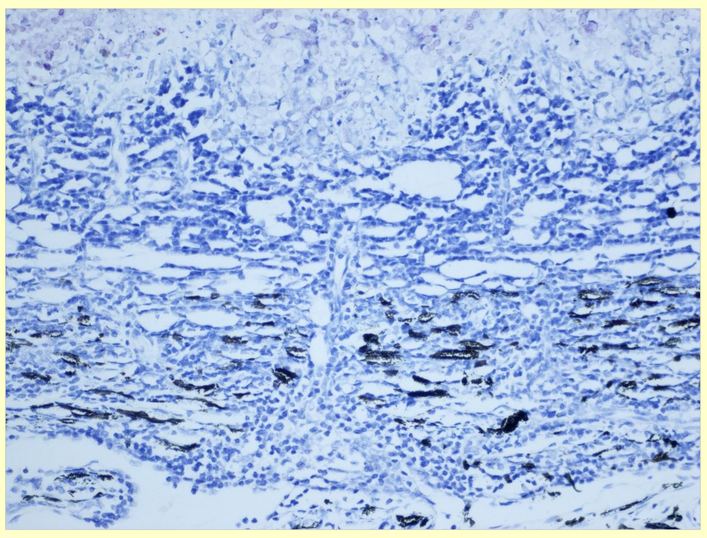

Fig. 4: Uvea posterior. Dense inflammatory infiltrate within uvea posterior and numerous overlying roundish to oval structures, Giemsa, 20x.

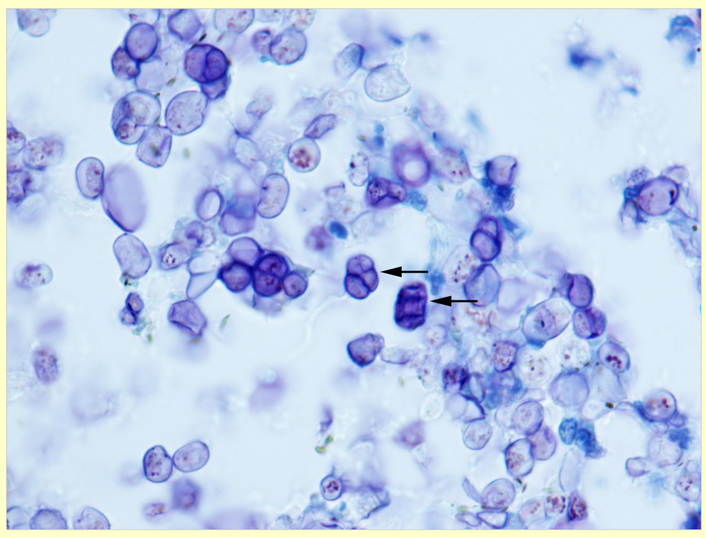

Fig. 5: Uvea posterior. Round to oval algal organisms with single nuclei. Sporadic endosporulation (arrowheads). Giemsa, 100x.

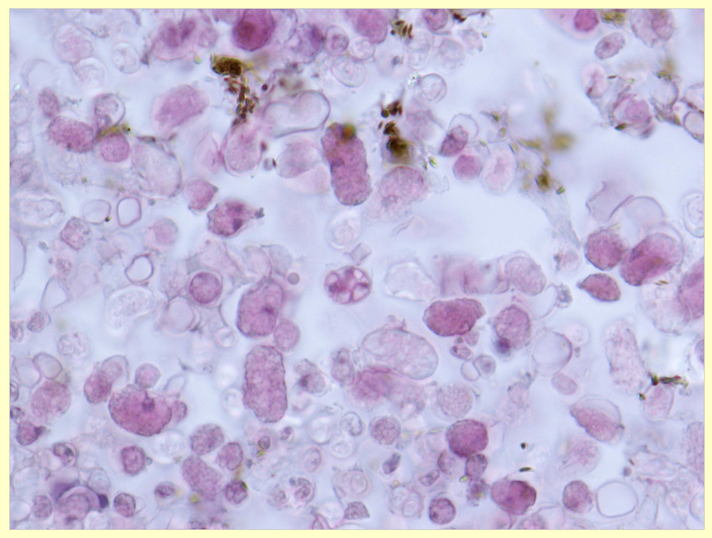

Fig. 6: Uvea posterior. A morula form is seen in center. PAS, 100x.

Histopathology: Subretinal mass was composed of thin-walled round to oval algal structures which measured from 8 x 15 µm up to 15 x 30 µm. They showed a single nucleus or no internal structures and rarely endosporulation, also in the form of a morula (Figs. 5, 6). Small groups of these organisms were also seen within the retina (Fig. 3). Between the organisms in vitreous just a few, but within uvea posterior and retina numerous lymphocytes, macrophages and plasma cells were seen (lympho-histiocytic uveitis posterior, retinitis and exsudative retinal detachment, Figs. 2, 3, 4). A small number of inflammatory cells were also found within the iridocorneal angle, explaining the secondary glaucoma.
Molecular Methods: The DNA extraction and purification from 5 µm sections was performed with the Maxwell® 16 Clinical Instrument. After amplification of the ITS2 region of rDNA with broad range primers for fungi and sequencing of the amplified DNA *Prototheca* spec. was identified by data bank analysis with NCBI-BLAST (94%; Accession no. FR848897.1). Part of the *Canis familiaris interphotoreceptor retinoid-binding protein* (*IRBP*) gene was amplified to document successful DNA preparation [1].

Discussion: A diagnosis of an ocular protothecosis was made based on pathohistological features, PCR and sequence analysis. Other inflammatory or neoplastic lesions could by ruled-out. Retrospective investigation of clinical history revealed a short episode of diarrhea 7 months before enucleation, but no further clinical diagnostics were performed at that time. In between the dog was in good general condition. The occurrence of diarrhea suggested the intestine as presumed locus of initial algal invasion with an ensuing algemia. The long latency, possibly caused by an intact immune system, and the specific eye affection is not understood yet. Ocular tropism has not only been described for *Prototheca spp.* but also for *Candida* in man, possibly due to haematogenous spread of yeasts [6]. Unfortunately, no specific therapy was initiated in this dog. Although there are no guidelines for treatment of protothecosis and the fatal outcome under therapy with antimycotic drugs is frequent, to our knowledge no self-limiting courses are published.

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