Morphological Description of Three Rare Canine Neuroepithelial Intraocular Tumours

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Introduction:
Tumours of glial and of neuroepithelial origin (except for iridociliary adenomas) are rare intraocular neoplasms in dogs. In the present study morphological and immunohistochemical features of three intraocular neoplasms are presented and categorised according the current WHO classification of tumours of domestic animals and humans.

Histological Classification of Ocular Tumours of Domestic Animals
... 2. Intraocular Tumours:
1. Melanocytic tumours
2. Iridociliary epithelial tumours
3. Medulloepithelioma
4. Iridociliary cysts
5. Feline primary ocular sarcoma
6. Iridal spindle cell tumour of blue-eyed dogs
7. Optic nerv glioma
8. Metastatic tumours

Human Tumors of the Eye and Ocular Adnexa
... 4. Tumors of the retina/ ciliary body:
...
3. Retinoblastoma
4. Glial tumours and tumour-like conditions
4.1.Astrocytoma
...
4.7.Neuroepithelial tumours
4.7.2. Medulloepithelioma
4.7.3 Teratoid medulloepithelioma
benign
malignant

Material and methods:
Case 1: The eye of a Golden Retriever presented a 0.5 cm large mass adherent to the optic disc.
Case 2: A Labrador Retriever showed a 1.5 x 1 x 0.5 cm wide neoplasm expanding the ciliary body.
Case 3: Within the eye of a German shepherd a 0.6 cm in diameter, retinal mass was found near-by the ora serrata. The entire bulbi were removed, fixed in 4% formaldehyde, routinely processed, embedded in paraffin wax, cut at 4 µm and stained hematoxylin-eosin (HE). Furthermore, immunohistochemistry (vimentin, glial fibrillary acidic protein (GFAP), S-100 and neurofilament (NF)) was performed using standardised laboratory protocols.

Case 1

Fig. 1: Medulloepithelioma. Note tumour on papilla optica.

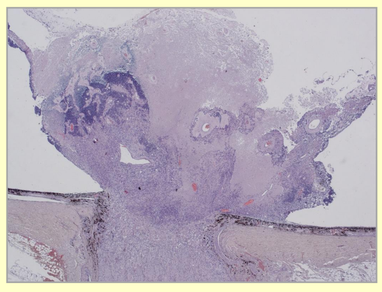

Fig. 2: Medulloepithelioma. Overview, HE, 20x.

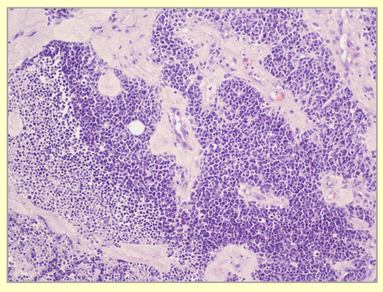

Fig. 3: Medulloepithelioma. Islets of primitive neuronal cells HE , 200x.

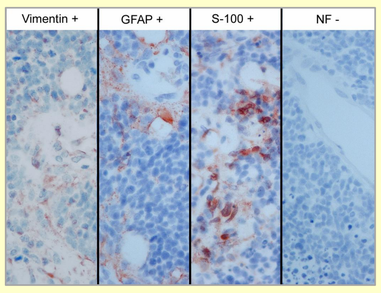

Fig. 4: Medulloepithelioma. Immunohistochemistry, 400x.

Case 2

Fig. 5: Benign teratoid medullo-epithelioma. Neoplasm on ciliary body.

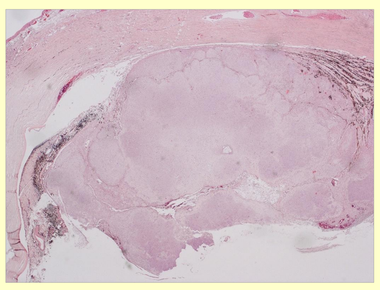

Fig. 6: Benign teratoid medullo-epithelioma. Overview, HE, 20x.

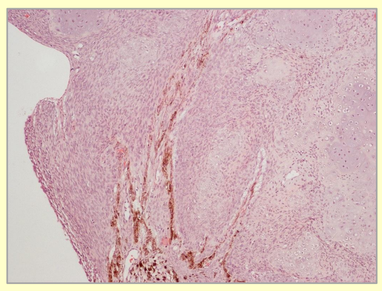

Fig. 7: Benign teratoid medullo-epithelioma. Chondroid islets surrounded by spindle cells, HE, 200x.

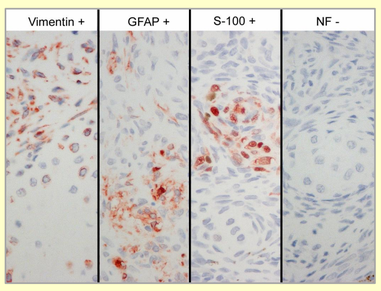

Fig. 8: Benign teratoid medullo-epithelioma. Immunohisto-chemistry, 400x.

Case 3

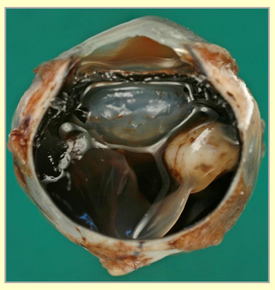

Fig. 9: Glioma. Intraretinal tumour.

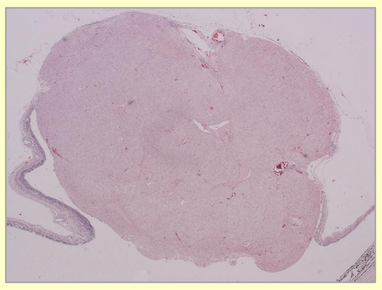

Fig. 10: Glioma. Overview HE, 20x.

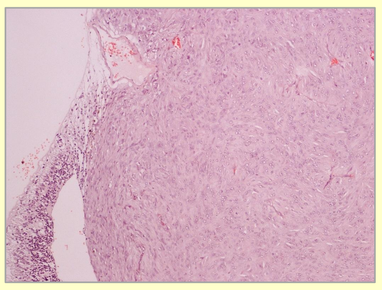

Fig. 11: Glioma. Tumour composed of spindle cells, HE, 200x.

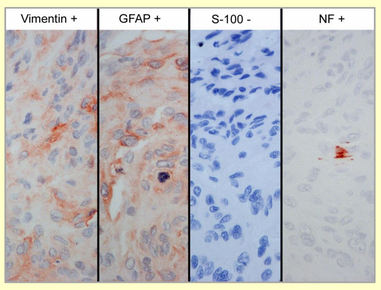

Fig. 12: Glioma. Immunohistochemistry, 400x.

Results:
Pathohistologically, tumour No. 1 consisted of densely arranged polygonal primitive neuronal cells forming few rosette-like structures with intraocular spreading. Unambiguous Homer-Wright or Flexner-Wintersteiner rosettes were not found. Immunohistochemical stainings were positive for vimentin, GFAP, S-100 and negative for neurofilament. Neoplasm No. 2 was composed of polygonal and spindle cells embedded in expanded chondroid areas. Immunohistochemical staining showed positivity for vimentin, GFAP, S-100 and negativity for neurofilament.
The retina was focally expanded by neoplasm No. 3 mainly composed of spindle cells. Immunohistochemical stainings were positive for vimentin, GFAP and negative for S-100 and neurofilament.

Discussion:
On base of the pathohistological features a medulloepithelioma was diagnosed in case 1. Typical rosettes as found as in human retinoblastomas were not seen. A benign teratoid medullo-epithelioma was diagnosed in case 2 and a retinal glioma (astrocytoma) in case 3. Medulloepitheliomas are congenital tumours derived from primitive neuroblasts even though clinical recognition may be delayed for years. Clinical behaviour has to be considered local malignant but metastases are not reported. In contrast the behaviour of benign teratoid medulloepithelioma and the glioma has to be assumed benign. Gliomas are rarely described neoplasms within the retina. Negative immun-histochemical staining for S-100 has to be considered false negative. Excision of all eyes was necessary because of the secondary glaucoma.

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