Intraocular primitive neuroectodermal tumours in two horses

Kristin Brandes[1] and Jens Peter Teifke[2]

[1]Animal Pathology Augsburg, Germany, [2]Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, Greifswald – Insel Riems, Germany

Introduction:
Intraocular tumours of neuroepithelial origin are rare in horses. Frequently young animals are affected. In the present study morphological and immunohistochemical features of two primary intraocular neoplasms of primitive neuroectodermal origin 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 (non teratoid)
4.7.3 Teratoid medulloepithelioma
benign
malignant

Material and methods:
Case 1: The posterior eye segment of a 1.5 yrs. old male warmblood presented a whitish mass (5 x 3 x 2 cm), expanding the uvea posterior and occupying 40% of the vitreous body.
Case 2: A 4 yrs. old male icelandic horse revealed a 3.5 x 2.5 x 2 cm wide and whitish neoplasm expanding the ciliary and vitreous body, uvea posterior and focally the iris with bulging into the anterior chamber.
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

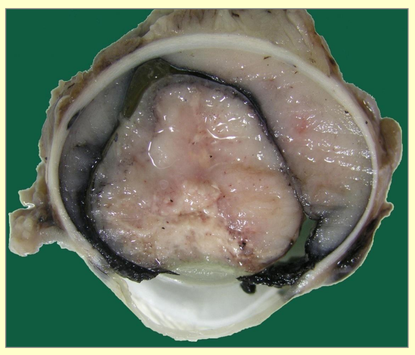

Fig. 1: Medulloepithelioma.
Tumour is expanding the uvea posterior and occupying vitreal space.

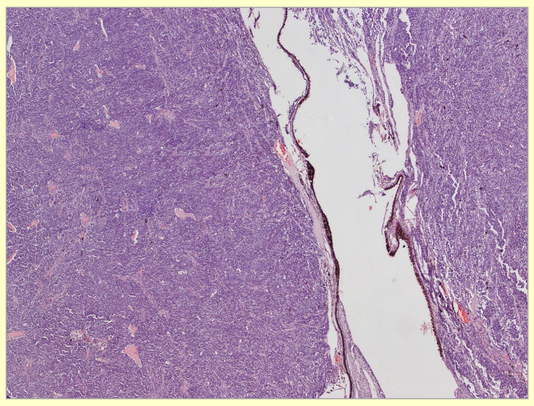

Fig. 2: Medulloepithelioma.
Tumour cells expanding uvea posterior (left) and vitreous body (right), HE, 20x.

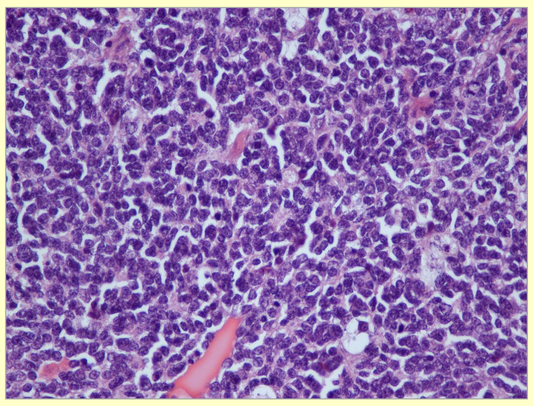

Fig. 3: Medulloepithelioma.
Tumour cells with hyperchromatic nuclei forming cavities with clear lumina or eosinophilic material inside, HE , 400x.

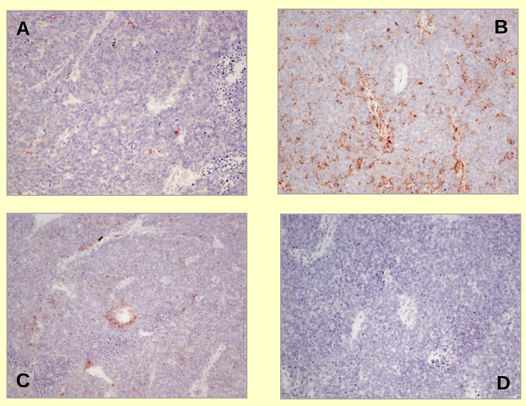

Fig. 4: Medulloepithelioma:
A: GFAP: +, B: VIM +++, C: S-100 +,
D: NF -, 400x.

Case 2

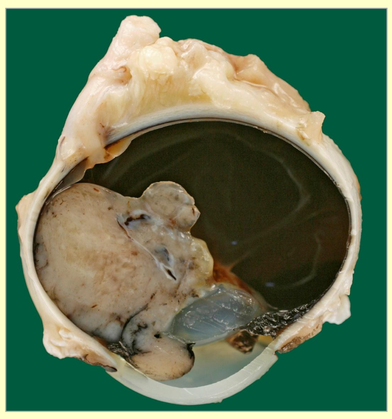

Fig. 5: Benign teratoid medullo-epithelioma. Neoplasm expanding the ciliary body and bulging into anterior chember.

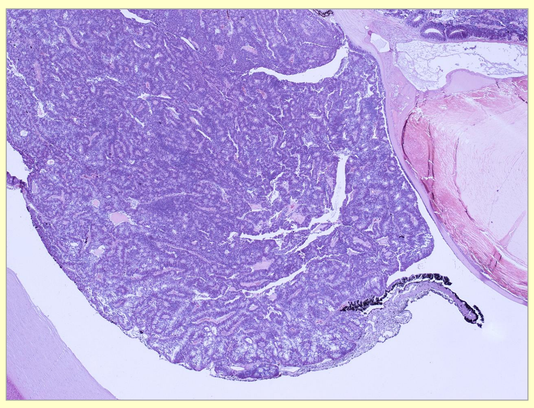

Fig. 6: Benign teratoid medulloepithelioma.
Tumour cells infiltrating the iris, HE, 20x.

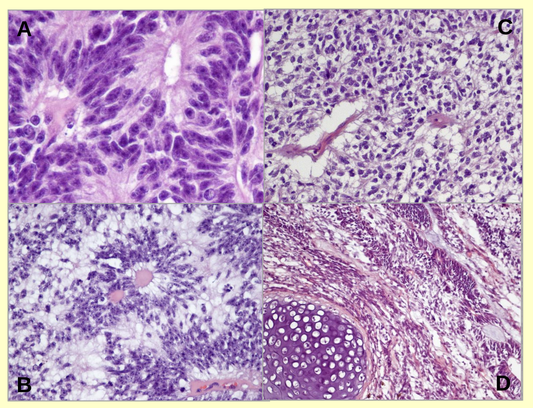

Fig. 7: Benign teratoid medulloepithelioma.
Flexner-Wintersteiner (A) and Homer-Wright rosettes (B), myxoid matrix (C) and chondroid islet (D), HE, 400x.

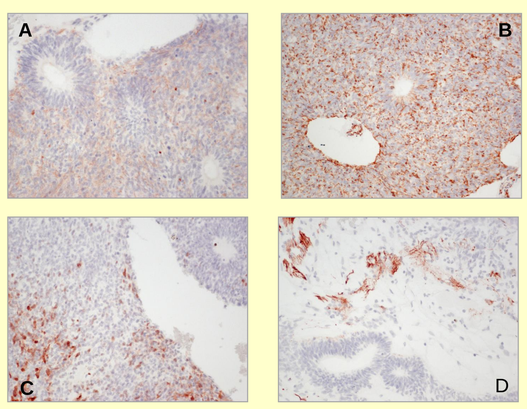

Fig. 8: Benign teratoid medulloepithelioma.
A: GFAP: ++, B: VIM +++, C: S-100 +/++
D: NF (+), 400x.

Results:
Pathohistologically, tumour No. 1 consisted of densely arranged cords of polygonal cells with hyperchromatic nuclei forming multiple cavities with clear lumina or eosinophilic material inside. Neoplasm No. 2 was composed of numerous rosettes (Flexner-Wintersteiner/ Homer Wright rosettes) and a spindle cell component embedded in a myxomatous matrix with areas of cartilage. In both cases, immunohistochemistry showed positivity for Vimentin (marker for primitive neuronal and glial progenitor cells), partial positivity for GFAP and S-100 (marker for glial differentiation) and negativity (case 1) and partial positivity (case 2) of tumour cells for neurofilament (marker for differentiated neuronal cells).

Discussion:
On base of pathohistological features a medulloepithelioma was diagnosed in case 1 and a benign teratoid medulloepithelioma in case 2.
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 in case 1 but metastasis were not reported. In contrast the behaviour of benign teratoid medulloepithelioma has to be considered benign. Excision of both eyes was necessary because of the secondary glaucoma.

Tierpathologie Augsburg

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