

Astrocytoma in a chamois

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Astrozytom bei einer Gemse

Astrozytome gehören zu den bei Mensch und Tier am häufigsten vorkommenden Gehirntumoren, wobei zytologisch der fibrilläre Typ am meisten vertreten ist. In diesem Bericht wird zum ersten Mal ein Thalamus-Astrozytom bei einer Gemse mit klinischen Zeichen von Bewusstseinstörung, Pleurothotonus und Rechtsdrall beschrieben.

Schlüsselwörter: Gemse, *Rupicapra rupicapra*, Gehirntumor, Astrozytom, Neurologie

Summary

Astrocytomas represent the most common cerebral tumors in humans and in animals, and the fibrillary cytological subtype is the most frequently observed. In this report and for the first time, a thalamic astrocytoma is described in a chamois showing depressed mentation, pleurothotonus and circling to the right side.

Keywords: chamois, *Rupicapra rupicapra*, intracranial tumour, astrocytoma, neurology.

Introduction

Reports of tumors in free-ranging Arctiodactyla are very rare (Kradel and Dunne, 1965; Nettles and Vandeveld, 1978; Burgisser, 1983; Borg and Nilsson, 1985; Ziemer et al., 1985; Biolatti et al., 1988; Aguirre et al., 1999, Perez-Martinez et al., 1999), and seldom refer to brain tumors (Kradel and Dunne, 1965; Nettles and Vandeveld, 1978; Borg and Nilsson, 1985; Ziemer et al., 1985). In the literature there are only two reports of tumors in the chamois, adenomatous neoplasms of the gallbladder (Biolatti et al., 1988) and a fibroblastic osteosarcoma (Perez-Martinez et al., 1999). This manuscript describes the clinical presentation and the pathology of a brain tumor in the chamois.

Clinical Evaluation

A 14 year-old male chamois (*Rupicapra rupicapra*) was hand captured by the gamekeepers in the Susa Valley (Cozian Alps) near Turin in October 1999 and transported to the Faculty of Veterinary Medicine of Turin. On presentation the animal appeared in poor condition with abnormally grown hooves and was blind on the right side. The chamois was kept in an enclosure where clinical examination was carried out. Ophthalmologic examination showed bilateral uveitis and corneal oedema.

Neurological examination revealed depressed mentation, pleurothotonus and circling on the right side (Fig. 1). Rear limbs proprioception mostly on the

right side was decreased. Menace reaction was absent on the right side, while pupillary light reflex was slightly decreased on both sides. No other cranial nerves deficits were detected. Spinal reflexes were normal. Analysis of atlanto-occipital cerebrospinal fluid (CSF) was normal (clear appearance, density:1005, protein 28.8mg/dl, white blood cells 0.7/mm³, mononuclear cells). A complete blood count and whole blood chemistry tests were not performed. Based on poor prognosis, the animal was euthanized and pathologic examination was performed.



Figure 1: Pleurothotonus and circling to the right side in a chamois from the Western Italian Alps affected by an astrocytoma.

Results

Necropsy

At necropsy the animal's weight was 21 kg. Fat deposits were absent at the abdominal, pericardial and heart level and bone marrow appeared gelatinous. No other gross lesions were observed. On external examination the brain showed diffused meningeal congestion and a moderate flattening of the parieto-temporal cortex. On transverse sections a slightly increased in volume of the lateral ventricles was present. The brain was fixed in 10% neutral buffered formalin.

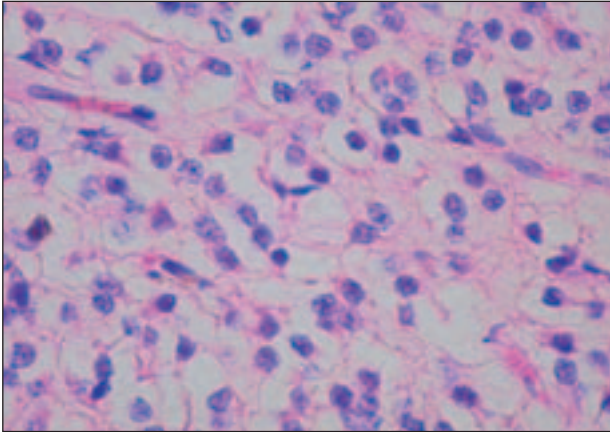


Figure 2: Neoplastic cells with interlacing processes, microcystic degeneration and capillary proliferation.

Histology

Brain coronal sections were paraffin embedded, sectioned at 5 µm and stained with hematoxylin and eosin (H-E). A cellular proliferation, poorly demarcated, was located in the dorsal part of the thalamus mainly on the left side. The tumor tissue was composed of loosely arranged polygonal cells that infiltrated the surrounding parenchyma. The cells had round to oval hyperchromatic nuclei and nucleoli were not always present. The cell borders were difficult to evaluate. Small amounts of eosinophilic cytoplasm were recognizable around the nuclei and interlacing processes with abundant glial filaments were observed. Mitotic figures were absent. Diffuse microcystic degeneration and capillary proliferation were seen within the cells. At the periphery of the neoformation the cells were arranged in perivascular palisades (Fig. 2).

Immunohistochemistry

Tumor tissue was immunostained to evaluate the reactivity to glial fibrillary acidic protein (GFAP) (1:2000, Dako Laboratories) and to S100 protein (1:1600, Dako Laboratories) using the avidin-biotin peroxidase complex (ABC) method (Vector Vectastain Laboratories ABC kit). Immunohistochemically the cytoplasm of the cells was diffusely and strongly positive for GFAP and for S100 protein. The histological and immunohistochemical findings were consistent with a diagnosis of a low-grade astrocytoma (fibrillary astrocytoma) (Koestner et al., 1999).

Discussion

Astrocytomas represent the most common cerebral tumors in humans and in animals. The fibrillary cytological subtype is most frequently observed and has been reported in dogs, cats, cattle and very rarely in mice and rats (Summers et al., 1995). Only one case has been published in the pig (Ziemer et al., 1985) and one in a baboon (Herring et al., 1990) and one in a boar (Ziemer et al., 1985). Astroglial tumors normally involve cerebral hemispheres, thalamus, hypothalamus and midbrain, rarely cerebellum and spinal cord. Macroscopically they appear as greyish-white areas, poorly demarcated and sometimes with haemorrhages or focal necrosis.

Microscopically some variants are described depending on the astrocytic cells involved in the neoplastic proliferation (fibrillary, protoplasmic and gemistocytic astrocytoma) but usually more than just one astrocytic cell types is present. The fibrillary form is normally characterized by low to moderate cellularity, scant perinuclear cytoplasm but abundant glial fibrillary acidic protein expression in the cell processes (Summers et al., 1995).

Neoplasm in free-ranging animals are only rarely observed compared to domestic species and reports usually refer to histopathological findings in dead animals. However, retrospective epidemiological studies in roe deer from Sweden have shown that the prevalence of some tumours could be as high as 2% (Aguirre et al., 1999). In our opinion long-term monitoring programs will give us valuable information about the frequency and the prevalence of tumors in wild species.

References

- Aguirre A.A., Brojer C., Morner T.*: Descriptive epidemiology of roe deer mortality in Sweden. *J. Wildlife Dis.* 1999, 35: 753–762.
- Biolatti B., De Meneghi D., Meneguz P.G., Cornaglia E.*: Neoplasms of gallbladder in chamois of the maritime Alps. *Schweiz. Arch. Tierheilk.* 1988, 130: 591–597.
- Borg K., Nilsson P.O.*: Ethmoid tumors in moose and roe deer. *Nord. Veterinaermed.* 1985, 37: 145–60.
- Burgisser H.*: Report on wild animal diseases from 1975 to 1982. *Schweiz. Arch. Tierheilk.* 1983, 125: 519–527.
- Herring J.M., Reyes M., Dochterman L.W., Bennet B.T.*: Glioblastoma multiforme in a baboon. *Lab. Anim. Sci.* 1990, 40: 645–647.
- Nettles V.E., Vandeveld M.*: Thalamic ependymoma in a white-tailed deer. *Vet. Pathol.* 1978, 15: 133–135.
- Koestner A., Bilzer T., Fatzer R., Schulman E.Y., Summers B.A., Van Winkle T.J.*: Histological classification of tumors of the Nervous System of Domestic Animals. Armed Forces Institute of Pathology, Washington, 1999, 17–19.
- Kradel D.C., Dunne H.W.*: Brain tumours (ependymomas) in deer. *J. Am. Vet. Me. Assoc.* 1965, 147: 1096–1098.
- Perez-Martinez C., Escudero-Diez A., Garcia-Iglesias M.J., Ferreras-Estrada M.C., Garcia-Fernandez R.A., Espinosa-Alvarez J.*: Fibroblastic osteosarcoma in a chamois (*Rupicapra pyrenaica parva*). *Vet. Rec.* 1999, 144: 154.
- Summers B.A., Cummings J.F., De Lahunta A.*: Tumors of the central nervous system. In: *Veterinary Neuropathology*. Mosby Year Book, St. Louis, 1995, 351–401.
- Ziemer E.L., Kramme P.M., Higgins R.J.*: Astrocytoma in a boar. *J. Am. Vet. Med. Assoc.* 1985, 187: 837–838.

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