A Glioma in the Spinal Cord of a Cat

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Primary intramedullary spinal cord tumors are rare in domestic animals and extremely rare in cats [1, 5]. This report concerns a primary intramedullary spinal cord tumor in a cat.

An 11-year-old spayed female domestic shorthair cat was presented to the University of Minnesota Teaching Hospital in lateral recumbency with tetraparesis. All laboratory parameters (electroencephalogram, cerebrospinal fluid tap, complete blood count, routine serum chemistries, urinalysis, and fundic examination) were within normal limits. Based on the clinical signs and the results of a neurological examination, a lesion was suspected in the midcervical spinal cord. A poor prognosis was given, and the animal was killed. At necropsy, the only lesion found was a swelling of the cervical spinal cord that was 1.5 cm long and 1.0 cm in diameter. The spinal cord was fixed in 10% neutral buffered formalin for seven days.

On sequential sections through the cervical spinal cord, a linear intramedullary mass was found (fig. 1). This mass traversed cervical cord segments C3 and C4. At its cranial end, the mass was solitary, centrally located, and well circumscribed. Caudally, the mass split into multiple, well-circumscribed, finger-like projections which extended into all areas of the cord. Multiple specimens were processed routinely for paraffin embedding, sectioned at 6 μm, and stained with hematoxylin and eosin (HE), Hortega’s silver stain, and phosphotungstic acid-hematoxylin (PTAH) for cytoplasmic blepharoplasts.

Histologically, all areas of the neoplasm were similar. There was compression of the surrounding neuropil, with limited local invasion. The most differentiated part of the tumor was composed of cells that were lined in evenly spaced rows, 2 to 3 cells thick. These rows were separated by eosinophilic homogeneous fibrillar material (fig. 2). The tumor cells were cuboidal to slightly fusiform, had scant eosinophilic cytoplasm, and round to oval nuclei that contained finely stippled chromatin with a single distinct nucleolus. The tumor cells formed pseudorosettes with eosinophilic homogeneous material between the capillary wall and the tumor-cell nuclei (fig. 2). In several areas, the tumor cells formed true rosettes (fig. 2). There were one to two mitotic figures per high power field.

Between the cords of tumor cells there was a moderate number of stellate-shaped cells that had densely basophilic, rod-shaped nuclei. These were compatible with reactive fibrillar astrocytes. Hyperplasia and hypertrophy of capillary endothelial cells were present throughout the mass, but were most severe at the periphery of the tumor.

There was a poorly circumscribed area of tumor surrounding the central canal. The tumor cells in this area had a similar appearance to the tumor cells in other areas, but formed a monotonous sheet instead of rows, rosettes, or pseudorosettes.

The spinal cord white matter that surrounded the tumor had diffuse axonal degeneration and moderate diffuse gliosis. PTAH stain revealed no blepharoplasts in neoplastic cells.

Ependymomas account for about 60% of all intramedullary spinal cord gliomas in man [4]. There are only a few reports of primary intramedullary spinal cord tumors in the dog and none in the cat [1, 3, 5–7]. The intramedullary tumors reported in the dog are astrocytomas and ependymomas [3, 5, 6]. Ependymomas that have been reported in the cat were located in the third ventricle [6], lateral ventricle [2], and olfactory bulb [6].
Ependymomas generally are composed of sheets of polygonal to fusiform cells that have round to oval nuclei containing finely stippled chromatin and a scant amount of eosinophilic cytoplasm with indistinct cell boundaries. These cells ideally contain blepharoplasts with cilia and are arranged in rosettes or pseudorosettes [2–4, 6]. The pseudorosettes have a nucleus-free zone adjacent to the capillary. The diagnosis of ependymoma is confirmed when blepharoplasts and cilia are demonstrable, however, they often are not observed and, therefore, the inability to demonstrate these structures should not preclude the diagnosis [4, 5].

A characteristic microscopic feature of the tumor from our cat is the palisading rows formed by the tumor cells. This feature is uncommon in ependymomas in man and has not been described in ependymomas in the dog and cat. This feature, however, does bear some resemblance to the polar spongioblastoma described in man [4]. Polar spongioblastomas are very rare tumors which usually are found in the brain of young persons. In recent literature, they usually are classified as poorly differentiated astrocytomas [1]. Polar spongioblastomas lack the rosettes and pseudorosettes that were found in the tumor of this report [4].

Polar spongioblastoma and ependymoma must be considered the differential diagnoses in this case, and without the demonstration of blepharoplasts by PTAH stain or electron

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**Fig. 1:** Sequential sections through cervical spinal cord segments C3 and C4; solitary and multiple areas of tumor. Left to right is cranial to caudal.

**Fig. 2:** Tumor cells arranged in true rosettes (arrows) surrounding capillary forming pseudorosette. Rows of tumor cells separated by eosinophilic homogeneous material. HE.
microscopy, polar spongioblastoma (poorly differentiated astrocytoma) cannot be ruled out completely. We attempted electron microscopic examination to see cilia and blepharoplasts in this neoplasm, but the results were not clear, perhaps because only previously paraffin-embedded tissue was available. Although the exact cell of origin could not be determined, this tumor was diagnosed as an ependymoma based on its location and microscopic appearance, especially the presence of rosettes and pseudorosettes, which were consistent with previously described ependymomas in the cat [2, 6], dog [3, 5], and man [4].

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References


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