

OCTOBER 2006: A 37-YEAR OLD MALE WITH HEADACHE

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CLINICAL HISTORY

A 37-year-old man presented with a 2-month history of headache and balance impairment. He also complained of nausea and two episodes of vomiting a few days before admission. His past medical history was unremarkable. Neurological examination showed mild left sided ataxia.

RADIOLOGIC AND OPERATIVE FINDINGS

Brain MR scans showed a heterogeneously enhancing superficial tumor arising from the left cerebellar cortex with a cystic component. The lesion caused vasogenic edema with mass effect on the fourth ventricle (Figure 1a and Figure 1b). Evidence of early hydrocephalus with dilatation of temporal horns was present. There was a large draining vessel lateral to the tumor. A pre-operative diagnosis of hemangioblastoma was suggested. The patient underwent posterior fossa craniotomy with complete excision of the tumor. Intra-operatively the lesion appeared well-demarcated from the cerebellar cortex except for its lateral portion wherein there was no cleavage. A large dilated vein on the tumor surface was seen postero-laterally. The patient fully recovered and after 6 months follow-up MR-scans did not show recurrence.

MICROSCOPIC FINDINGS

The tumor was well-demarcated from the cerebellar cortex and extended into the subarachnoid space. It had compact architecture (Figure 2), with a dense vascular network and was composed of cuboidal and columnar cells, mostly showing a perivascular arrangement (Figure 3). No fibrillary background was present. There were some perivascular pseudorosettes featuring a "cartwheel" appearance that consisted of columnar cells with short

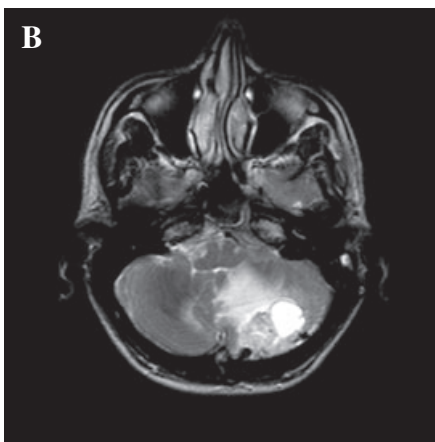
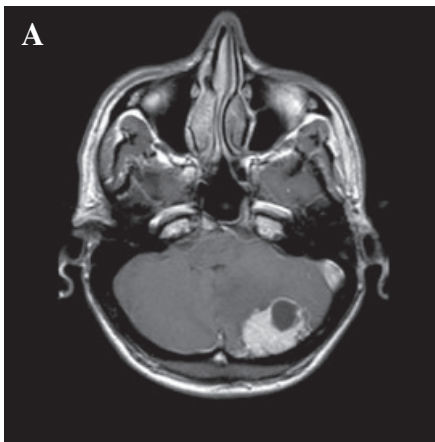


Figure 1.

cytoplasmic processes and eccentric nuclei (Figure 4). The vascular network was composed of capillaries and medium sized vessels, some of which had thick and fibrotic walls. Mitoses were rare (average 1 per 30 fields at 400×). No necrosis or endothelial proliferation was present. Most of the neoplastic cells expressed GFAP (Figure 5), S-100 protein and NSE. Immunostains for cytokeratin CAM5.2, cytokeratins AE1/AE3, smooth muscle actin, CD31, EMA, chromogranin and synaptophysin were negative. The Ki67 labeling index was 5%. Ultrastructural examination showed a tumor composed of apposed plump cells surrounding capillaries with grossly thickened basal lamina. Narrow cytoplasmic processes interdigitated between the cells and were in contact with the basal droplets. Cell junctions were primitive and intermediate. Several conspicuous intracytoplasmic whorls of endoplasmic reticulum were present. Intracytoplasmic lumina, ciliary bodies and microvilli were absent.

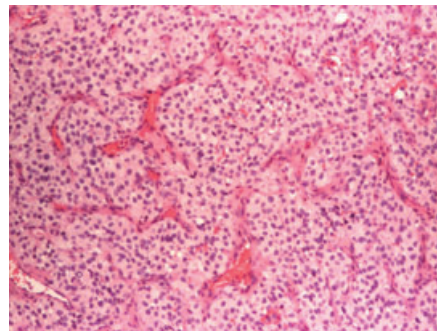


Figure 2.

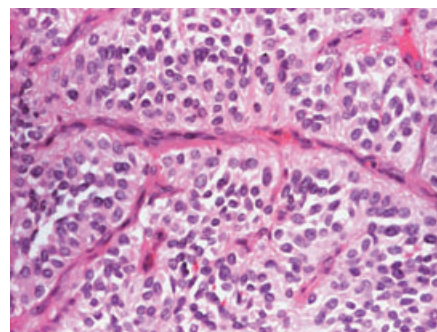


Figure 3.

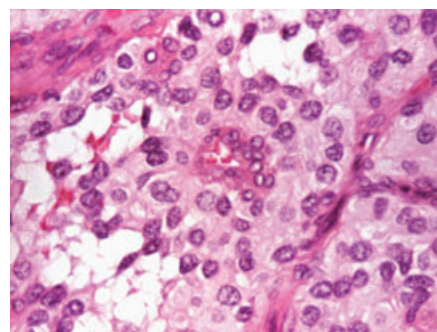


Figure 4.

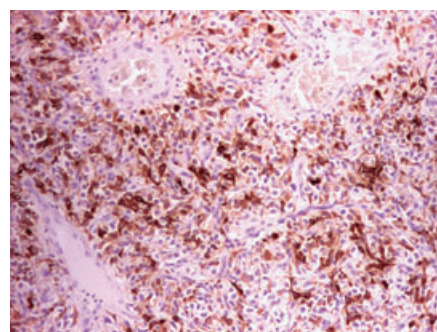


Figure 5.

DIAGNOSIS

Cerebellar low grade astroblastoma.

DISCUSSION

Astroblastoma is a rare glial neoplasm of uncertain histogenesis. Most often seen in young adults, it usually occurs in the cerebrum, often shows cortical location and may extend into the subarachnoid space (4, 7). Examples arising from the cerebellar cortex have also been reported, but they are exceedingly rare (3, 4). Radiologically they are well-demarcated from the surrounding brain. They often show diffuse enhancement after contrast administration and, not infrequently, contain cysts (8). The histologic hallmark is the characteristic "cartwheel" perivascular pseudorosette. Originally described by Bailey and Bucy (3), it is composed of neoplastic cells having thick and short cytoplasmic processes and peripheral nuclei radiating from a vessel. When they become less cohesive, the astroblastic pseudorosettes may appear as true papillary structures. Two important diagnostic features are the lack of a fibrillary background and the compressive rather than infiltrative margin, this latter feature being seen in both low and high grade tumors. A prominent vascular network with a variable number of hyalinized vessels is also a frequent feature of astroblastomas (4, 5). Immunoreactivity for GFAP and S-100 protein is the rule, but the number of positive cells varies from case to case and even from different areas of the same tumor (5). Some astroblastomas may show focal expression of EMA (5, 8). Immunoreactivity for NSE has been reported, but it seems to be the result of a non-specific reaction (9). By electron microscopy, astroblastomas have distinct blood vessels with thick basement membrane and abundant collagen. The processes of the tumor cells that constitute the pseudorosettes connect to collagen fibers without an intervening basal lamina (6, 9, 10). A recent study demonstrated that astroblastomas have characteristic chromosomal aberrations as they show gain of chromosomes 19 and 20. These peculiar chromosomal abnormalities sustain the view that astroblastoma is a distinct entity rather than a variant of ependymoma (5).

Prognosis of astroblastoma is variable and depends on extent of resection and grade (4, 11). Although not accepted by

the current WHO classification of brain tumors (7), a grading system has been proposed (11). Based on degree of cellular atypia, mitoses, and microvascular proliferation, this grading system reportedly allows distinction between low and high grade tumors. Low grade lesions have indolent behavior and excellent long term survival after total resection whereas high grade astroblastomas are aggressive and often convert into a glioblastoma (4, 11).

Differential diagnosis includes ependymoma, astrocytoma with focal astroblastic-like pseudorosettes, and papillary meningioma. Unlike astroblastomas, ependymomas have a fibrillary background (5) and ultrastructurally they more frequently contain cilia and intracellular lumina with microvillous projections (6, 8). Anaplastic astrocytomas with astroblastic pseudorosettes always infiltrate the surrounding brain (5). Papillary meningiomas can be confused with astroblastomas because of superficial location, but unlike astroblastoma papillary meningiomas show no expression of GFAP (2) and ultrastructurally have easily identified cell-to-cell junctions consisting of well-formed desmosomes (1).

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