Oligoastrocytoma

In the World Health Organization Classification of Tumors of the Central Nervous System 2016, the diagnosis of oligoastrocytoma is strongly discouraged. Nearly all tumors with histological features suggesting both an astrocytic and an oligodendroglial component can be classified as either astrocytoma or oligodendroglioma using genetic testing. The diagnoses of WHO grade II oligoastrocytoma and WHO grade III anaplastic oligoastrocytoma are, therefore, assigned NOS designations, indicating that they can only be made in the absence of appropriate diagnostic molecular testing.

Notably, rare cases of “true” oligoastrocytomas have been reported in the literature, with phenotypic and genotypic evidence of spatially distinct oligodendroglioma and astrocytoma components in the same tumor; until further reports confirming such tumors are available for evaluation as part of the next WHO classification, they should be included under the provisional entities of oligoastrocytoma, NOS, or anaplastic oligoastrocytoma, NOS. In addition, in such settings, particular care should be taken to avoid misinterpretation of regional heterogeneity due to technical problems with ancillary techniques, such as false-negative ATRX immunostaining or false-positive FISH results for 1p/19q codeletion, which can occur regionally within tissue specimens.

Oligoastrocytoma has been practically eliminated from the WHO Classification (with only the Not Otherwise Specified category remaining, i.e., for tumors without complete molecular analysis), the presence of genetically true oligo-astrocytomas with dual genotype [1) 2)] has been acknowledged in the Blue Book but not considered a distinct WHO entity.

Oligoastrocytomas are a subset of brain tumors that present with an appearance of mixed glial cell origin, astrocytoma and oligodendroglioma.

These types of glial cells that become cancerous are involved with insulating and regulating the activity of neuron cells in the central nervous system. Often called a “mixed glioma”, about 2.3% of all reported brain tumors are diagnosed as oligoastrocytoma.

The median age of diagnosis is 42.5.

Oligoastrocytomas, like astrocytomas and oligodendrogliomas, can be divided into low-grade and anaplastic variant, the latter characterized by high cellularity, conspicuous cytologic atypism, mitotic activity and, in some cases, microvascular proliferation and necrosis.

However, lower grades can have less aggressive biology.

These are largely supratentorial tumors of adulthood that favor the frontal and temporal lobes.

see Anaplastic oligoastrocytoma.

Case reports

Kim et al. reported two cases were initially diagnosed as oligodendroglioma with 1p/19q-codeletion and mutation of isocitrate dehydrogenase 1 (IDH1)-R132H. The recurrent tumors showed loss of alpha-thalassemia/mental retardation X-linked (ATRX) expression, strong P53 positivity, and 1p/19q-nondeletion. Next-generation sequencing analysis performed on the first case confirmed the

transition of molecular traits from oligodendroglioma to astrocytoma. An IDH mutation of R132H was preserved in the episodes of recurrence, but ATRX and TP53 mutations were newly acquired and TERT promoter mutation C228T was lost at the most recent recurrence. The issue in question for the presented cases is whether the original tumors were pure oligodendrogliomas that then transdifferentiated into astrocytomas, or whether the original tumor was an oligoastrocytoma having oligodendroglioma cells that outnumbered the astrocytoma cells and where the astrocytoma cells becoming more dominant over the episodes of recurrence. With the recognition of the possibility of lineage conversion, our study suggests that molecular examination should be performed to adjust therapeutic strategies in recurrent gliomas. Indeed, our observation of lineage conversion in glioma recurrence calls into question the current distinction drawn between oligodendroglioma, astrocytoma and oligoastrocytoma, rather than simply bidding “farewell to oligoastrocytoma.” [3].

1)
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2)
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