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Perspective

Mechanism of Pilocytic Astrocytoma in Adults

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DESCRIPTION

Pilocytic astrocytomas are central nervous system tumour that usually develops within the first two decades of life. Although they are most common in children's midline structures, pilocytic astrocytoma in the adult ventricular system is uncommon. The tumour had a biphasic development pattern, with compacted cellular sections with Rosenthal fibers and loose textured microcystic areas with eosinophilia granular bodies, according to histology. There were no signs of mitosis or necrosis. Immunohistochemical tests revealed the presence of Glial Fibrillary Acid Protein (GFAP) and Olig2. Molecular analysis confirmed that there is no gene mutation. This clinical presentation, in conjunction with the histologic and molecular findings, is consistent with a pilocytic astrocytoma arising in the third ventricle of this adult brain, indicating that pilocytic astrocytoma can present as an intraventricular tumour in an adult patient and should be routinely included in the differential diagnosis of intraventricular neoplasm.

Pilocytic astrocytomas are Central Nervous System (CNS) tumour that most typically occurs during the first two decades of life with a peak incidence between the ages of 8 and 13 years. Although these tumours are frequently seen in midline areas such as the posterior fossa, cerebellum, thalamus, hypothalamus, and so on they seldom occur within an adult patient's cerebral ventricle. Pilocytic astrocytomas are genetically related with the absence of Iso-Citrate Dehydrogenase (IDH) gene mutation, and in most, but not all cases, genomic abnormalities in the Mitogen-Activated Protein Kinase (MAPK) pathway. Bipolar piloid cells with long, hair-like processes and elongated, moderately pleomorphic nuclei were observed in cytological preparation for intra-operative consultation, as were smaller cells with short, cobweb-like processes and round to oval nuclei. There were Rosenthal fibers and eosinophilic granular bodies detected. The paraffin-embedded tissue histologically revealed a biphasic development pattern composed of compacted cellular areas with Rosenthal fibers and loose textured microcystic areas with eosinophilic granular bodies. Immunohistochemical tests show that Glial Fibrillary Acid Protein (GFAP) and Olig2 were expressed in the neoplastic cells, although Epithelial Membrane Antigen (EMA) was not expressed. An intraventricular tumour is considerably more likely to develop from choroid plexus, ependymal or sub ependymal tissue.

Meningioma, lymphoma, and metastases are some less prevalent intraventricular cancers. Colloid cysts, choroid plexus papilloma's, and ependymomas are the most frequent third ventricle tumours. A pineal tumour can occasionally be seen in the third ventricle. Immunohistochemical investigations show that the Glial Fibrillary Acid Protein (GFAP) and Olig2 are present, indicating that the neoplasm is glial. Pilocytic astrocytoma contributes for 1.3% of all malignancies of the central nervous system. It is the most common glioma in children during their first two decades of life, with a median age of 12-years-old, which declines significantly from young people between the ages to 15-19 years old. Pilocytic astrocytoma accounts for approximately one-third of gliomas in patients aged 0 to 14 years. Pilocytic astrocytoma is substantially less prevalent in adulthood. It usually appears a decade before diffuse astrocytoma and is rarely found in patients above the age of 50.

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