EDITORIAL

Immunohistochemistry: In Different Grades of Astrocytoma

Astrocytomas are considered the most prevalent central nervous system tumors and originate from astrocytes. According to the WHO classification, Astrocytomas are divided into four histopathological grades based on cellular atypia, mitotic rate, vascular changes, and necrosis.1 Proper astrocytoma grading helps neurosurgeons and neuro-oncologists treat and assess the overall prognosis properly. Numerous studies have relied on various factors, ranging from tumor suppressor genes to proliferation markers, to gain insights into tumor behavior. Ki-67 and p53 are two cellular proteins that have roles in the pathogenesis and progression of astrocytoma.

Ki-67 is a nuclear non-histone protein antigen expressed at the cell cycle's G1, S, G2, and M phases and absent in the resting cells (G0). The monoclonal antibody MIB-1 detects Ki-67 nuclear antigens in proliferating cells, and the percentage of immunopositive cells is referred to as the Ki-67 labeling index (LI). The Ki-67 labeling index (proliferative index) estimates the growth of neoplasms quantitatively and can act as an ancillary tool in understanding tumor behavior. The product of the normal TP53 gene is a nuclear phosphoprotein known as p53 ("wild type" p53 protein). It is one of the major factors governing cell proliferation, suppressing growth, and cell transformation. Mutations result in the alteration of the p53 protein, and this "mutant" protein, having a longer half-life than the "wild protein," aggregates in the nucleus, reacting at a threshold of immunohistochemical detection.2

Studies regarding Ki-67 and p53 expression in astrocytoma were few in our country. One of the studies was performed in the Department of Pathology at Rajshahi Medical College over 24 months, from January 2021 to December 2022. It included 30 patients who were histopathologically diagnosed as having astrocytoma. Histopathological examination was done in the Department of Pathology, RMC. Immunoexpression of Ki-67 and p53 were evaluated in 30 formalin-fixed and paraffin-embedded blocks of astrocytoma in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. In this study, Ki-67 and p53 labeling indices showed significant differences between grade I and IV astrocytoma and grade II and IV astrocytoma. However, there was no statistically significant difference between grades I and II or between grades I and III. The results were similar to the study done by Sharma et al. in 2018 and Belghali et al. in 2017. Patients of low-grade astrocytoma with increased Ki-67 and p53 labeling indices might be at risk of progressing to higher grade. These cases could be detected for close monitoring and follow-up using Ki-67 and p53 immunohistochemistry.

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References:

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