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Methylation Status of the O6-Methylguanine-Deoxyribonucleic Acid Methyltransferase Gene Promoter in World Health Organization Grade III Gliomas.

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OBJECTIVE: We analyzed the methylation status of the O6-methylguanine-DNA methyltransferase (MGMT) gene promoter in World Health Organization (WHO) grade III gliomas in association with other molecular markers to evaluate their prevalence. METHODS: The samples of a total of 36 newly WHO grade III glioma patients including 19 anaplastic oligodendrogliomas (AO), 7 anaplastic oligoastrocytomas (AOA), and 10 anaplastic astrocytomas (AA) were analyzed. The methylation status of the MGMT gene promoter was confirmed by methylation-specific polymerase chain reaction. The 1p/19q chromosomal deletion status and EGFR amplification were assessed by Fluorescence In-Situ Hybridization. MGMT, EGFR, EGFRvIII, and p53 expression were analyzed by immunohistochemical staining. RESULTS: The MGMT gene promoter was methylated in 32 (88.9%) and unmethylated in 4 (11.2%). Among them, all of the AO and AOA had methylated MGMT gene promoter without exception. Significant associations between MGMT gene promoter hypermethylation and 1p/19q deletion was observed ($p = 0.003$). Other molecular markers failed to show significant associations between MGMT gene promoter statuses. CONCLUSION: There was extensive epigenetic silencing of MGMT gene in high grade gliomas with oligodendroglial component. Together with frequent 1p/19q co-deletion in oligodendroglial tumors, this may add plausible explanations supporting the relative favorable prognosis in oligodendroglial tumors compared with pure astrocytic tumors.

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