S25. Are Gliomas Preventable?

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Gliomas are a family of primary central nervous system (CNS) tumors of variable malignancy that are considered derivative from supporting glia (astrocytes, oligodendrocytes, ependymal cells) or their progenitor stem cells. In order to devise a prevention strategy for gliomas, one would either have to understand what causes gliomas in order to modulate these factors, or develop an approach that would prevent lower-grade gliomas from developing into higher-grade gliomas. In both cases time-dependent mortality would be lowered.

In this presentation, I will focus on the known chromosomal, genetic, and protein changes associated with the different histological varieties of glioma and the environment, heredity, and infectious/viral agents that might have an impact on glioma development and malignant progression. I will discuss a number of scenarios based on the known genetic patterns of these tumors and the changes in genetic patterns that take place in parallel with progressive malignancy. If one could prevent specific gene mutations and/or deletion of specific chromosomes that lead to low-grade (WHO II) gliomas, then theoretically this strategy would reduce the occurrence of high-grade (WHO III and IV) gliomas and thereby prolong life. For the de novo WHO III and WHO IV tumors, being able to prevent or counter specific gene mutations and/or deletion of specific chromosomes would in itself reduce the occurrence of these gliomas and increase survival. Alternatively, if one could develop a curative treatment for low-grade glioma that prevents these chromosomal/gene changes then one could "prevent" death from glioblastoma (WHO IV) and also prolong life. Obviously, if this last case were possible, then earlier ascertainment and treatment of low-grade gliomas would be beneficial and "preventative" in the sense that it would reduce the occurrence of high-grade gliomas and their attendant mortality. Lastly, if gliomas were a more common cancer and less expensive imaging methods existed, one could contemplate a "neuroimaging screening" approach similar to the use of mammography for breast cancer.