Malignant Transformation of a Dysembryoplastic Neuroepithelial Tumor (DNET) Characterized by Genome-Wide Methylation Analysis

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Dysembryoplastic neuroepithelial tumors (DNET) are considered to be rare, benign, and associated with chronic epilepsy. We present the case of a 28-year-old man with a history of epilepsy since age 12. Surgery of an occipital cortical lesion in 2009 revealed a DNET. Five years later, a recurrent tumor at the edge of the resection cavity was removed, and the tissue underwent an intensive diagnostic workup. The first tumor was unequivocally characterized as a DNET, but neuropathological diagnostics of the recurrent tumor revealed a glioblastoma. After 6 months, another recurrent tumor was detected next to the location of the original tumor, and this was also resected. An Illumina 450 K beadchip methylation array was performed to characterize all of the tumors. The methylation profile of these tumors significantly differed from other glioblastoma and epilepsy-associated tumor profiles and revealed a DNET-like methylation profile. Thus, molecular characterization of these recurrent tumors suggests malignant transformation of a previously benign DNET. We found increased copy number changes in the recurrent DNET tumors after malignant transformation. Modern high-throughput analysis adds essential molecular information in addition to standard histopathology for proper identification of rare brain tumors that present with an unusual clinical course.