

Pre and Intraoperative Predictive Factors for Genetic Subgrouping of Adult Supratentorial Gliomas

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Introduction

Clinical significance of genetic subgrouping of gliomas has been validated by its strong association with prognosis of patients. Recently, we investigated IDH1/2 and TP53 mutations via direct sequencing for adult supratentorial gliomas and reported that PCR-based sequence analysis classify gliomas into three genetic subgroups in widely available methods; IDH mutant gliomas without TP53 mutations, IDH and TP53 mutant gliomas, and IDH wild-type gliomas. In the present study, we investigated the correlation radiological findings including computed tomography (CT) and magnetic resonance imaging (MRI) with genetic subgroups.

Methods

We examined 167 adult patients with supratentorial glioma who underwent an initial surgery at Fujita Health University between 2005 and 2015. The tumor characteristics were preoperatively evaluated using CT and/or MRI including MR spectroscopy (MRS). We collected clinical information for preoperative factors including gender, age at onset, laterality, location of tumors, calcification on CT, gadolinium enhancement on MRI, quantification of tumor metabolites analyzed by MRS, and intraoperative 5-aminolevulinic acid (5-ALA) fluorescence.

Results

Age at diagnosis, location of tumor, gadolinium enhancement, and 5-ALA fluorescence were highly statistically significant predictive factors to evaluate whether IDH mutant or not ($P < 0.0001$ for all factors). On the other hand, calcification and laterality were statistically significant predictive factors for separating TP53 wild-type and TP53 mutation in IDH mutant gliomas ($p = 0.0023$ and 0.0009 , respectively). In addition, quantification analysis based on MRS showed that lipid13/tCho ratio can be a statistically significant marker to differentiate TP53 wild-type and TP53 mutation in IDH mutant gliomas ($p = 0.0255$).

Conclusions

In this study, we showed several pre and intraoperative statistically significant predictive factors for supratentorial gliomas. These results could help us to plan appropriate management including surgery and adjuvant therapy for glioma patients.

Learning Objectives

The aim of this study is to clarify widely available factors detected by CT and MRI to predict genetic subgrouping and plan the best surgical strategy considering patient prognoses.

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