Impact of gross total resection in patients with WHO grade III glioma harboring the IDH 1/2 mutation without the 1p/19q co-deletion.

Kawaguchi T, Sonoda Y, Shibahara I, Saito R, Kanamori M, Kumabe T, Tominaga T.

Abstract

The prognosis of patients with WHO grade III gliomas is highly dependent on their genomic status such as the isocitrate dehydrogenase (IDH) 1/2 mutation and 1p/19q co-deletion. However, difficulties have been associated with determining which tumors have certain genomic profiles by preoperative radiographical modalities, and the role of surgical resection in achieving better outcomes remains unclear. This retrospective study included 124 consecutive patients with newly diagnosed grade III gliomas. The genomic status of IDH1/2 and 1p/19q was analyzed in these patients. Tumors were then divided into 3 subgroups based on their genomic status; the IDH 1/2 mutation with the 1p/19q co-deletion (1p/19q co-del), the IDH 1/2 mutation without the 1p/19q co-deletion (non-1p/19q co-del), and the IDH 1/2 wild type (IDH wt). Survival times were compared between patients who underwent gross total resection and those who did not (GTR versus non-GTR). The relationships between genomic statuses and MR imaging characteristics such as ring-like or nodular enhancements by gadolinium, and very low intensity on T1-weighted images with blurry enhancements (T1VL) were also examined. Among all patients with grade III gliomas, GTR patients had longer median survival and progression-free times than those of non-GTR patients (undefined versus 87 months, p = 0.097, and 124 versus 34 months, p = 0.059, respectively). No significant differences were observed in survival between GTR and non-GTR patients in the 1p/19q co-del group (p = 0.14), or between GTR and non-GTR patients in the IDH wt group (26 and 27 months, p = 0.29). On the other hand, in non-1p/19q co-del group, survival was significantly longer in GTR patients than in non-GTR patients (undefined versus 77 months, p = 0.005). Radiographically, T1VL was detected in most tumors in the non-1p/19q co-del group (78.2 %), but only 6 (21.4 %) and 17 (41.5 %) tumors in the 1p/19q co-del and IDH wt groups, respectively. A correlation was not found between other genomic subgroups and MR imaging findings. Strict surgical removal is important to improve the prognosis of patients with grade III gliomas, especially for tumors with the IDH 1/2 mutation without the 1p/19q co-deletion. The MR finding of T1VL can be used to select candidates for more radical resection.

KEYWORDS: 1p/19q; Glioma; IDH; Magnetic resonance imaging; Surgery; WHO grade III