Resection for WHO Grade III gliomas

TO THE EDITOR: We read with great interest the re-
search by Fujii et al.4 (Fujii Y, Muragaki Y, Maruyama T,
et al: Threshold of the extent of resection for WHO Grade
III gliomas: retrospective volumetric analysis of 122 cases
using intraoperative MRI. J Neurosurg [epub ahead of
print September 8, 2017. DOI: 10.3171/2017.3.JNS162383])
regarding extent of resection for WHO grade III gliomas.
The article is well written, and the authors have demonstrated
that extent of resection (EOR) of T2-weighted high–signal intensity lesions (T2-EOR) was one of the
most important prognostic factors for patients with ana-
plastic astrocytoma (AA) and anaplastic oligoastrocytoma
(AOA) and an especially significant survival advantage
was seen with T2-EOR ≥ 53%. We highly commend the
authors for performing this interesting study because these
helpful results would be useful to make a balanced
treatment decision planning to prolong patient survival.
However, after a detailed analysis of this article, we would
like to highlight 3 important issues that it raises.

First, 122 patients with newly diagnosed WHO grade III
gliomas had undergone intraoperative MRI–guided resec-
tion during the period from March 2000 to December 2011.
In the article’s Results section, however, it is unclear how
many patients underwent a second reoperation for recurrent
WHO Grade III gliomas after initial resection. It would be
helpful to the reader to know whether reoperation for recur-
rent WHO grade III gliomas can improve overall survival.
Unfortunately, there is no evidence to date that supports this
hypothesis. However, there exists a relationship between
reoperation and overall survival of patients with recurrent
glioblastoma.2 In the report by Tully et al. of 204 patients
with de novo glioblastoma, 49 patients (24%) with recur-
rent glioblastoma underwent reoperation, and the median
overall survival in the reoperation group was 20.1 months,
compared with 9.0 months in the no-reoperation group (p =
0.001), demonstrating that reoperation was associated with
longer overall survival.2 Coburger et al. revealed similar
results from their study of 170 surgeries for glioblastoma,
showing that repeated surgery for recurrent disease has a
beneficial effect on overall survival.2

Second, the authors concluded that a significant survival
advantage was associated with resection of 53% or more
of the preoperative T2-weighted high–signal intensity vol-
ume? Some studies indicate that intraoperative cortical and
subcortical stimulation can be used to identify functional ar-
eas or tracts and to guide surgical removal of gliomas in elo-
quent areas.1,3 This approach may be able to maximize the
extent of resection while minimizing the risk of permanent
deficit.1,3 Furthermore, awake craniotomy as a special meth-
od can prevent motor deficits during the resection of gliomas
adjacent to eloquent cortex. Ghinda et al. reported that com-
bined awake craniotomy and intraoperative MRI was safe
and efficient, allowing maximal safe resection of eloquent
area gliomas with possible subsequent benefits in terms of
overall survival and progression-free survival.5 However,
what is the exact maximal safe resection for gliomas near
eloquent areas? A few studies have indicated that a safe mar-
gin of 8 mm should be maintained between the limits of
resection and the pyramidal tracts.8,9 So it was probably wise
to tailor the resection of gliomas adjacent to eloquent cortex
according to intraoperative electrophysiological investiga-
tion, manifestation of intraoperative tasks for awake surgery,
and intraoperative MRI, rather than only resection of 53% or
more of the T2-weighted high–signal intensity lesions.

Third, we noted that the authors did not analyze data
from patients who simultaneously presented with IDH1/2
mutation and 1p/19q co-deletion. The authors concluded
that T2-EOR was not significantly different in patients
with AO at any cutoff value, which may be associated with
1p/19q co-deletions and response to chemotherapy.4 We
wonder whether T2-EOR was also not significantly dif-
dent for survival in patients with glioma with the IDH1/2
mutation and 1p/19q co-deletion? Kawaguchi et al. inves-
tigated the impact of gross-total resection (GTR) in their
series of 124 patients with WHO grade III glioma. They
found that patients with tumors with IDH1/2 mutation and
1p/19q co-deletion had better outcomes, and that GTR or
lack of GTR had no significant effect on the survival of
such patients.6 We expect that the authors further validated
the relationship between T2-EOR and survival in patients
with WHO grade III glioma with IDH1/2 mutation and
1p/19q co-deletion. This may influence therapeutic strate-
gies and clinical decisions.

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Second, with respect to tumor location, we defined the eloquent region as ≥ 1 of the following areas according to previous studies:

- Motor cortex
- Sensory cortex
- Visual center
- Language cortex
- Motor tracts
- Basal ganglia
- Internal capsule

This study included 59 patients (48%) who had tumors in an eloquent region, and the median T2-EOR in that group was 68.0%. Thirty-two (54%) of the 59 patients who had tumors in an eloquent region underwent awake craniotomy. The median T2-EOR in these 32 patients was 84.8%. These EOR values were higher than 53%, demonstrating that we achieved extensive resection even though the tumor was located in a radiologically eloquent area. This is because, as described by Chang et al.,1 radiological eloquent areas are not always discovered to be truly eloquent. We performed extensive resection only when the radiologically eloquent area was found to be “false-eloquent.” We agree with Dr. Liu that, regarding tumors in or near eloquent regions, surgeons should not pay excessive attention to high EOR and should resect as much tumor as possible with multiple modalities, such as awake craniotomy and functional mapping.

Third, as we mentioned in the paragraph on the limitations of our study in the Discussion section, this study lacked data from 23 patients (18.9%) concerning 1p/19q co-deletion, because that examination began in 2004 at our institution. Analyzing data from the remaining 99 patients (81.1%) for whom we had data on 1p/19q co-deletion, 41 patients had tumors showing IDH1 mutation and 1p/19q co-deletion and only 2 patients died. EOR had no significant effect on survival in this group because of the small number of events, as expected. These data are compatible with findings from previous reports regarding WHO grade II and III gliomas.2–4

We hope to report new data with molecular analyses in the future.

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