

The surgeon may be aided in the delicate onco-functional balance in resection of malignant gliomas by the combined use of 5-ALA and awake craniotomy with cortical and subcortical mapping

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BACKGROUND: In high-grade gliomas the use of 5-ALA as surgical assistance is proven not only to increase the number of patients with gross-total resection (GTR) but also improve overall survival (OS). Not all patients may have the benefit of GTR due to closeness to eloquent areas risking neurological deficits. In low grade gliomas awake surgery and cortical and subcortical is becoming standard of care in most centers. There is sofar minimum knowledge of this procedure in high-grade-gliomas.

HYPOTHESIS: Combining 5-ALA surgical assistance and awake neurosurgery may help the surgeon achieving the best possible resection maintaining the onco-functional balance for the individual patient.

METHODS: 19 patients aged 35 to 70, median age 54 (9 females) was operate for suspected malignant glioma (WHO grade 3 or 4) with the combined method of 5-ALA assisted surgery and awake surgery with cortical and subcortical mapping. The patients were identified from our operation planning software. Retrospectively the hospital records were rewieved for information on neuropsychological assistance, histological report, postoperative MRI and neurological status.

RESULTS: The procedure was the 1st operation for 11 of 19 patients, for 5 patients it was the second operation and for 4 patients it was the 3rd or more procedure. In 9 of 11 patients (80 %) who went through 1st surgery the histopathological diagnosis was GBM dropping to 2 of 5 (40 %) in second surgery group. In 5 of 19 patients complete resection was achieved with new neurological deficits/worsening in 1 patient. In 7 patients no MRI were performed and in 7 patients a STR was achieved. The patients were neurological improved in 2 cases, unchanged in 6 cases and worsened in 11 cases with subsequent improvement again in all but two cases.

DISCUSSION:

Initially we thought it would be difficult logistically to organise awake craniotomy with cortical and subcortical mapping in patients with high grade gliomas within the Danish national fast-track program, i.e. surgery must take place within less than 14 days. There are no timeframe restraints for patients with low-grade glioma, hence we have previously focused our awake craniotomy program on these patients. Second we suspected it complicated to explain *and* getting consent to this combined complex treatment in such short time. Thus in the beginning this procedure was used for patients with known low-grade glioma suspected of malignant degeneration as reflected in the results. With general acceptance from the patients (few complains after surgery about the procedure) the procedure got more widely used.

CONCLUSION:

Despite initial concern this combined procedure using mapping and 5-ALA was demonstrated feasible assisting the surgeon in the important onco-functional balance when treating patients with malignant brain tumours.