Combination of 5-ALA and iMRI in re-resection of recurrent glioblastoma.
Quick-Weller J, Lescher S, Forster MT, Konczalla J, Seifert V, Senft C.

Abstract
Background Tumour resection plays a role in the initial treatment but also in the setting of recurrent glioblastoma (rGBM). To achieve maximum resection, 5-aminolevulinic acid (5-ALA) and intraoperative MRI (iMRI) are used as surgical tools. Aiming at complete tumour re-resection, we started combining iMRI with 5-ALA to find out if this leads to better surgical results. Methods We performed tumour resections in seven patients with rGBM, combining 5-ALA (20 mg/kg bodyweight) with iMRI (0.15 T). Radiologically complete resections were intended in all seven patients. We assessed intraoperative fluorescence findings and compared these with intraoperative imaging. All patients had early postoperative MRI (3 T) to verify final iMRI scans and received adjuvant treatment according to interdisciplinary tumour board decision. Results Median patient age was 63 years. Median KPS score was 90, and median tumour volume was 8.2 cm³. In six of seven patients (85%), 5-ALA induced fluorescence of tumour-tissue was detected intraoperatively. All tumours were good to visualise with iMRI and contrast media. One patient received additional resection of residual contrast enhancing tissue on intraoperative imaging, which did not show fluorescence. Radiologically complete resections according to early postoperative MRI were achieved in all patients. Median survival since second surgery was 7.6 months and overall survival since diagnosis was 27.8 months. Conclusions 5-ALA and iMRI are important surgical tools to maximise tumour resection also in rGBM. However, not all rGBMs exhibit fluorescence after 5-ALA administration. We propose the combined use of 5-ALA and iMRI in the surgery of rGBM.

KEYWORDS: 5-Aminolevulinic acid; extent of tumour resection; intraoperative MRI; recurrent glioblastoma

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