Acta Neurochir (Wien). 2024 May 13;166(1):212. doi: 10.1007/s00701-024-06108-9.

Association of 5-aminolevulinic acid fluorescence guided resection with photodynamic therapy in recurrent glioblastoma: a matched cohort study

Erasmo Barros da Silva Jr [1 2], Marília Wellichan Mancini Vasquez [3 4], Bernardo Correa de Almeida Teixeira [5], Maurício Coelho Neto [6], Flávia Sprenger [5], Jorge Luis Novak Filho [6], Luciana Almeida-Lopes [3 4], Ricardo Ramina [6]

Affiliations

PMID: 38739282 DOI: 10.1007/s00701-024-06108-9

Abstract

Purpose: Glioblastoma is a malignant and aggressive brain tumour that, although there have been improvements in the first line treatment, there is still no consensus regarding the best standard of care (SOC) upon its inevitable recurrence. There are novel adjuvant therapies that aim to improve local disease control. Nowadays, the association of intraoperative photodynamic therapy (PDT) immediately after a 5-aminolevulinic acid (5-ALA) fluorescence-guided resection (FGR) in malignant gliomas surgery has emerged as a potential and feasible strategy to increase the extent of safe resection and destroy residual tumour in the surgical cavity borders, respectively.

Objectives: To assess the survival rates and safety of the association of intraoperative PDT with 5-ALA FGR, in comparison with a 5-ALA FGR alone, in patients with recurrent glioblastoma.

Methods: This article describes a matched-pair cohort study with two groups of patients submitted to 5-ALA FGR for recurrent glioblastoma. Group 1 was a prospective series of 11 consecutive cases submitted to 5-ALA FGR plus intraoperative PDT; group 2 was a historical series of 11 consecutive cases submitted to 5-ALA FGR alone. Age, sex, Karnofsky performance scale (KPS), 5-ALA post-resection status, T1-contrast-enhanced extent of resection (EOR), previous and post pathology, IDH (Isocitrate dehydrogenase), Ki67, previous and post treatment, brain magnetic resonance imaging (MRI) controls and surgical complications were documented.

Results: The Mantel-Cox test showed a significant difference between the survival rates ($p = 0.008$) of both groups. 4 postoperative complications occurred (36.6%) in each group. As of the last follow-up (January 2024), 7/11 patients in group 1, and 0/11 patients in group 2 were still alive. 6- and 12-months post-treatment, a survival proportion of 71,59% and 57,27% is expected in group 1, versus 45,45% and 9,09% in group 2, respectively. 6 months post-treatment, a progression free survival (PFS) of 61,36% and 18,18% is expected in group 1 and group 2, respectively.

Conclusion: The association of PDT immediately after 5-ALA FGR for recurrent malignant glioma seems to be associated with better survival without additional or severe morbidity. Despite the need for larger, randomized series, the proposed treatment is a feasible and safe addition to the reoperation.

Keywords: 5-ALA; Fluorescence-guided resection; Glioblastoma; High-grade glioma; Photodynamic therapy; Recurrence.