5-Aminolevulinic Acid for Glioblastoma recurrence resection

5-ALA should be regarded as a useful and safe intraoperative tool in recurrent glioma surgery [1].

Prior treatment modalities, such as radiation or chemotherapy, do not invalidate the 5-aminolevulinic acid guided resection [2].

However, there are controversies on the 5-ALA fluorescence status in Glioblastoma recurrence resection, with specific reference to pseudoprogression or radionecrosis; therefore, the safety and accuracy of operative planning in 5-ALA-assisted procedures in the recurrent context are still unclear.

In a systematic review and meta-analysis of comparative studies on the use of 5-ALA in newly diagnosed and recurrent Glioblastoma, consistently conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. Data on fluorescence status and correlation between fluorescence and histological findings were collected. They performed a meta-analysis of proportions to estimate the pooled rates of each outcome.

Three online medical databases (PubMed, Scopus, Cochrane Library) were screened, 448 articles were evaluated, and 3 papers were finally included for data analysis. Fluorescence rate was not different between newly diagnosed and recurrent Glioblastoma [p = 0.45; odds ratio (OR): 1.23; 95% CI: 0.72-2.09; I2 = 0%], while the rate of 5-ALA fluorescence-positive areas not associated with histological findings of Glioblastoma cells was higher in recurrent Glioblastoma (p = 0.04; OR: 0.24; 95% CI: 0.06-0.91; I2 = 19%). Furthermore, there were no cases of radionecrosis in false-positive samples, while inflammation and signs of pseudoprogression were found in 81.4% of the cases.

Therefore, a robust awareness of 5-ALA potentialities and pitfalls in recurrent Glioblastoma surgery should be considered for a cognizant surgical strategy. Further clinical trials could confirm the results of the present meta-analysis [3].

1)
Broekx S, Weyns F, De Vleeschouwer S. 5-Aminolevulinic acid for recurrent malignant gliomas: A systematic review. Clin Neurol Neurosurg. 2020 Aug;195:105913. doi: 10.1016/j.clineuro.2020.105913. Epub 2020 May 16. PMID: 32447151.
2)
Nabavi A, Thurm H, Zountsas B, Pietsch T, Lanfermann H, Pichlmeier U, Mehdorn M; 5-ALA Recurrent Glioma Study Group. Five-aminolevulinic acid for fluorescence-guided resection of recurrent malignant gliomas: a phase ii study. Neurosurgery. 2009 Dec;65(6):1070-6; discussion 1076-7. doi: 10.1227/01.NEU.0000360128.03597.C7. PMID: 19934966.
3)
Ricciardi L, Sturiale CL, Scerrati A, Stifano V, Somma T, Ius T, Trungu S, Acqui M, Raco A, Miscusi M, Della Pepa GM. 5-Aminolevulinic Acid False-Positive Rates in Newly Diagnosed and Glioblastoma recurrence: Do Pseudoprogression and Radionecrosis Play a Role? A Meta-Analysis. Front Oncol. 2022 Feb 17;12:848036. doi: 10.3389/fonc.2022.848036. PMID: 35252015; PMCID: PMC8891510.