

Lighting Up Tumors – Fluorescein Sodium Guides Resection of Recurrent Glioblastoma Multiforme – Experience of Two European Centers

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Introduction

Glioblastoma is the most common primary brain tumor with a high recurrence and mortality rate. Nearly all patients will have tumor recurrence. Maximizing the extent of resection (EOR) is the cornerstone of neurosurgical treatment. The emergence of surgical microscopes with a fluorescein-specific filter have facilitated fluorescein-guided microsurgery and tumor resection. Fluorescein Sodium (FL) provides a high sensitivity and specificity for high grade glioma tissue. Here, we present our experience with FL and the dedicated surgical microscope filter in 88 patients with glioblastoma recurrence.

Methods

88 patients with recurrent glioblastoma were included (43 women, 45 men, mean age 53 years). Between 200-1000 mg of FL was intravenously injected on average 45 min. before tumor resection. A YELLOW 560 nm filter was used for microsurgical tumor resection and resection control. Indications for reoperation as well as adjuvant therapies were screened. Surgical reports were evaluated regarding the degree of fluorescent staining, postoperative MRIs within 48 hours regarding extent of resection and neurological outcome, complications and adverse effects.

Results

Bright fluorescent staining was reported for all patients, which markedly enhanced tumor visibility and was deemed helpful for tumor resection. 22 patients (25 %) showed residual tumor tissue in the postoperative MRI examination, here patient safety and preservation of function averted venture into eloquent areas. Thus, gross-total resection was achieved in 75 % (n=66) of patients. In five patients' early reoperation achieved gross-total resection. No adverse effects were registered over the postoperative course.

Conclusions

FL can yield similar results as existing markers like 5-ALA but in a much easier fashion. It is a readily available method for fluorescence-guided tumor resection. FL and the YELLOW 560 nm filter may improve resection with minimal risk and tumor margins are clearly visualised, they are safe and feasible tools for resection of recurrent disease in glioblastoma.

Learning Objectives

To learn about fluorescence-guided tumor resection. Appreciate learning

curve, advantages, drawbacks and pitfalls associated with sodium

fluorescein and the dedicated microscope filter.

References

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