

5-ALA Fluorescence, Neuromonitoring and Intraoperative Image Guidance for Surgical Treatment of Glioblastoma in Elderly Population: State of Art or Overtreatment?

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Introduction

The role of surgery in the management of glioblastoma patients aging > 65 years is controversial. This study describes our institutional experience in treating glioblastomas in elderly population, highlighting the impact of 5-aminolevulinic acid (5-ALA) guidance and of supportive intraoperative tools (neuromonitoring, intra-operative CT) on surgical and clinical results.

Methods

52 patients (29 males, 23 females, mean age 72, range 65-83) suffering from glioblastoma and aging over 65 year old have been included in this study. 31 patients (Group A) underwent 5-ALA fluorescence guided surgical resection; intraoperative CT scan and electrophysiological mapping of eloquent areas were also used in selected cases. An historical cohort of 21 patients (Group B) surgically treated before the introduction of 5-ALA at our Institution with conventional microneurosurgery and neuronavigation were used as control group. Pre- and post-operative Karnofsky performance score (KPS), Temozolomyde cycles, Radiotherapy doses and extent of tumor resection (EOTR) were measured in both groups.

Results

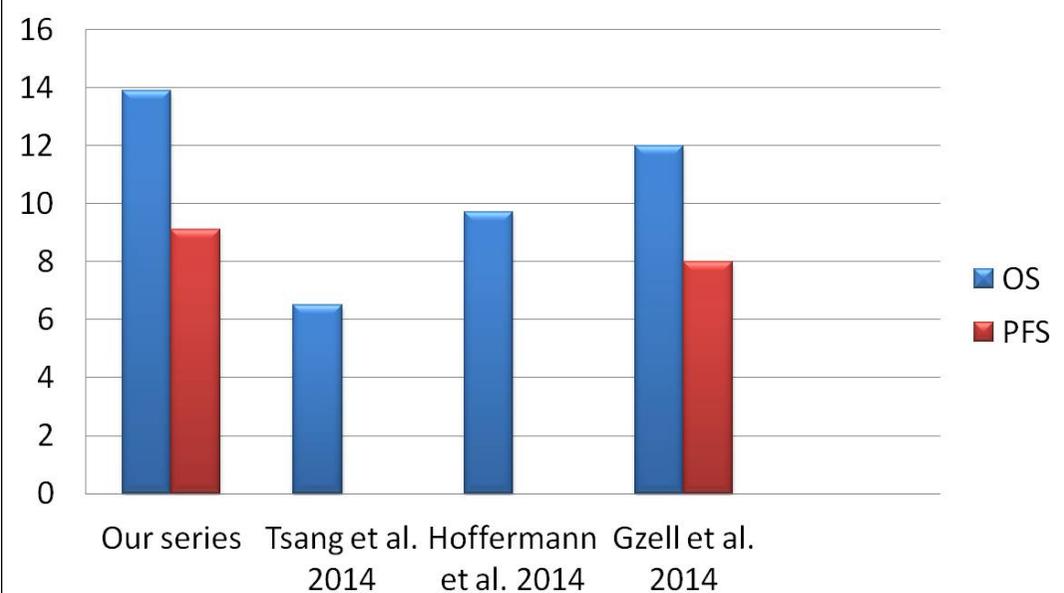
Mean KPS varied from 69.67 to 70.69 and from 58 to 63, mean temozolomyde cycles were 7.03 and 6, mean radiotherapy doses 52.51 and 57.0 in Group A and B respectively. Gross total resection has been achieved in 30/31 and in 19/21 patients in Group A and B respectively. Overall survival (OS) was 13.87 and 11 months respectively, whereas progression free survival (PFS) was 9.13 and 7.38 months respectively.

Conclusions

Aggressive surgical treatment, helped by 5-ALA fluorescence and application of supportive technologies such as i-CT or neuromonitoring, may guarantee an extended but still safe resection of glioblastoma even in elderly patients. Maintenance of a good performance status in the elderly population is essential to allow the adequate administration of adjuvant therapies after surgery and to improve survival parameters.

References

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Comparative analysis with literature demonstrates advantages in clinical outcomes; note that Gzell's series includes over-60 patients, differently from the other series, which include only over-65 patients.

	Group A - 5-ALA (n=31)	Group B - NO 5-ALA (n=21)
Mean age (range)	71.9 (65-82)	72 (65-83)
KPS		
Mean (range) pre-op	69.67 (50-100)	58 (10-80)
Mean (range) post-op	70.69 (40-100)	63 (10-90)
Techniques		
Computed tomography (CT)	8	1
Neuromonitoring	13	—
Neuronavigation	31	19
Surgery		
Biopsy	—	1
STR	1	1
GTR	30	19
Adjuvant treatments		
RT dosage - Mean (range)	52.51(30-60)	57(30-66)
TMZ cycles - Mean (range)	7.03 (2-16)	6(3-18)
Outcome		
OS - Mean (range)	13.87 (5-45)	11.0 (4-30)
PFS - Mean (range)	9.13 (2-26)	7.38 (2-14)
KPS: Karnofsky performance status; STR: sub-total resection; GTR: gross-total resection; OS: overall survival; PFS: progression-free survival.		

Results of comparative analysis of 5-ALA group with historical cohort