MASS EFFECT AND MIDLINE SHIFT IN GLIOBLASTOMA-WORSE PROGNOSIS?

Gonçalves M, Carvalho B, Vaz R, Linhares P

Serviço de Neurocirurgia do Centro Hospitalar e Universitário São João - Faculdade de Medicina da Universidade do Porto

Introduction:

- Midline shift caused by glioblastoma mass effect has been associated with a worse prognosis
- This evidence is not consistent in the literature

Objective:

- To analyse relationship between midline shift (MLS), progression free survival (PFS) and overall survival (OS) in a series of glioblastoma patients submitted to resective surgery at our centre

Methods:

- Retrospective study of pre-operative MRI scans (axial contrast-enhanced T1-weighted or T2-weighted sequences) of 163 glioblastoma patients submitted to resective surgery
- MLS measurements were performed according to the c=a/2-b method described in the literature
- PFS and OS calculated with Kaplan-Meier method (log-rank test SPSS version 23)

Results:

Table 1 - Patient data and results

No. patients	163
Sex (male/female)	98/65
Median Age (years; range)	59 (26-79)
ECOG 0-1	129 (79.1%)
ECOG >1	34 (20.9%)
Gross Total Resection	91 (55.8%)
MLS (mm; median; range)	3.5 (0-15.2)
MLS < 5mm	107 (65.6%)
MLS ≥ 10mm	14 (8.6%)
Global PFS (months; median; range)	8 (1-66)
Global OS (months; median; range)	17 (3-87)

Figure 1 - PFS Kaplan-Meier (KM) curves for groups MLS < 5mm vs. MLS ≥ 5 mm (left image) and MLS < 10mm vs. MLS ≥ 10 mm (right image).

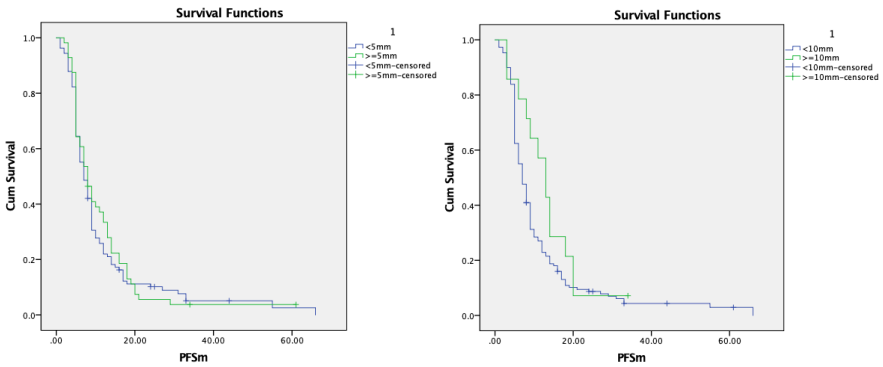
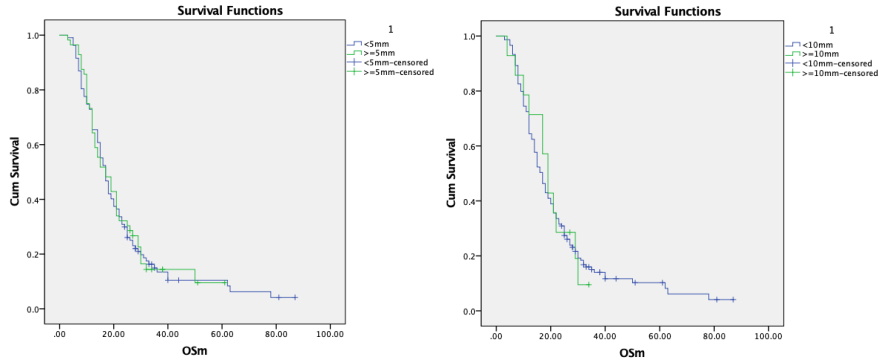


Figure 2 - OS KM curves for groups MLS < 5mm vs. MLS ≥ 5 mm (left image) and MLS < 10mm vs. MLS ≥ 10 mm (right image).



Median PFS (Fig. 1)	MLS < 5mm vs. ≥ 5 mm = 7 vs. 8 months MLS < 10mm vs. ≥ 10mm = 7 vs. 13 months	**p = 0.591** **p = 0.147**
Median OS (Fig. 2)	MLS < 5mm vs. ≥ 5 mm = 17 vs. 17 months MLS < 10mm vs. ≥ 10mm = 17 vs. 19 months	**p = 0.875** **p = 0.921**

Conclusion:

- Despite some previous evidence that MLS may have an impact on PFS or OS, our series does not replicate these results
- Therefore, we believe MLS should not be considered as a prognostic marker in glioblastoma, nor should it be used to influence the choice of treatment in these patients

References:

- Gamburg ES, et al. *THE PROGNOSTIC SIGNIFICANCE OF MIDLINE SHIFT AT PRESENTATION ON SURVIVAL IN PATIENTS WITH GLIOBLASTOMA MULTIFORME*, Int. J. Radiation Oncology Biol. Phys., Vol. 48, No. 5, pp. 1359–1362, 2000
- Lacroix M, et al. *A multivariate analysis of 416 patients with glioblastoma multiforme: prognosis, extent of resection, and survival*, J Neurosurg 95:190–198, 2001
- Liao C, et al. *Brain Midline Shift Measurement and Its Automation: A Review of Techniques and Algorithms*, International Journal of Biomedical Imaging Volume 2018, Article ID 4303161
- Stummer W, et al. *EXTENT OF RESECTION AND SURVIVAL IN GLIOBLASTOMA MULTIFORME: IDENTIFICATION OF AND ADJUSTMENT FOR BIAS*, Neurosurgery 2008 Mar;62(3):564-76; discussion 564-76.