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[BMC Cancer](#). 2011 Apr 12;11(1):127. [Epub ahead of print]

Does age matter? - A MRI study on peritumoral edema in newly diagnosed primary glioblastoma.

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Abstract

ABSTRACT:

BACKGROUND: Peritumoral edema is a characteristic feature of malignant glioma related to the extent of neovascularisation and to vascular endothelial growth factor (VEGF) expression. The extent of peritumoral edema and VEGF expression may be prognostic for patients with glioblastoma. As older age is a negative prognostic marker and as VEGF expression is reported to be increased in primary glioblastoma of older patients, age-related differences in the extent of peritumoral edema have been assessed.

METHODS: In a retrospective, single-center study, preoperative magnetic resonance imaging (MRI) scans of steroid-naive patients (n=122) of all age groups were analysed. Patients with clinically suspected, radiologically likely or known evidence of secondary glioblastoma were not included. Extent of brain edema was determined in a metric quantitative fashion and in a categorical fashion in relation to tumor size. Analysis was done group-wise related to age. Additionally, tumor size, degree of necrosis, superficial or deep location of tumor and anatomic localization in the brain were recorded.

RESULTS: The extent of peritumoral edema in patients > 65 years (ys) was not different from the edema extent in patients [less than or equal to] 65ys (p=0.261). The same was true if age groups [less than or equal to] 55 ys and [greater than or equal to] 70 ys were compared (p=0.308). However, extent of necrosis (p=0.023), deep tumor localization (p=0.02) and frontal localisation (p=0.016) of the tumor were associated with the extent of edema. Tumor size was not linearly correlated to edema extent (Pearson F=0.094, p=0.303) but correlated to degree of necrosis (F=0.355, p<0.001, Spearman-Rho) and depth of tumor (p<0.001). In a multifactorial analysis of maximum edema with the uncorrelated factors age, regional location of tumor and degree of necrosis, only the extent of necrosis (p=0.022) had a significant effect.

CONCLUSION: Age at diagnosis does not determine degree of peritumoral edema, and tumor localization in the white matter is associated with greater extent of edema. The area of necrosis is reflective of volume of edema. In summary, the radiographic appearance of a glioblastoma at diagnosis does not reflect biology in the elderly patient.

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