



## GFAP and alpha1a-AR staining and nuclear morphometry of oligodendrogliomas by confocal microscopy and image analysis. Useful parameters for predicting survival in oligodendrogliomas

Ernesto Moro Rodríguez<sup>1</sup>, Javier Figols<sup>2</sup>, Mariano Alvira<sup>3</sup>, José A Uranga-Ocio<sup>1</sup>, Eduardo García-Poblete<sup>1</sup>

*1 Universidad Rey Juan Carlos, Madrid, Spain).*

*2 Hospital Universitario Marqués de Valdecilla, Santander, Spain.*

*3 Pathologist. Seattle, USA*

joseernesto.moro@urjc.es

### Abstract

**Objective:** This study attempts to evaluate the GFAP and alpha1a-AR staining and morphometrical nuclear features of oligodendrogliomas and their prognostic implications as compare to present histopathology classification and their outcome survival.

**Study design:** Surgical specimens from 24 patients with oligodendrogliomas during the period 1981-2000 were included. These cases were classified into two groups defined by the grade of the neoplasm: Group I: oligodendrogliomas grade II; Group II: oligodendrogliomas grade III and two groups based on the outcome status: Group of the alive cases and group of the death cases. Death rate for the groups were obtained by patients' charts. Descriptive statistics were used to examine the groups with respect to the morphometrical nuclear variables: Area, perimeter, aspect, axis's (major and minor), diameters (max, mean and min.), radius (max. and min.) margination, ratio of perimeter-area, roundness and sizes (length and width). In addition, a immunofluorescence method for GFAP and 1a-AR were performed and their area, density and intensity of staining were analyzed.

**Results:** Semiautomated quantitative morphometrical results showed that the variables of nuclear area (GII 48.87 $\mu$ m<sup>2</sup> vs. GIII 43.45 $\mu$ m<sup>2</sup> p-value=0.02), aspect (GII 1.39 vs. GIII 1.55 p-value=0.03), axis minor (GII 6.66 $\mu$ m vs. GIII 6.01 $\mu$ m p-value= 0.003), diameter minor (GII 5.93 $\mu$ m vs. GIII 5.27 $\mu$ m p-value=0.002), radius minor (GII 2.64 $\mu$ m vs. GIII 2.25 $\mu$ m p-value=0,003), perimeter-area (GII 0.0007 vs. GIII 0.0006 p-value=0.04), size width (GII 6.60 $\mu$ m vs. GIII 5.96 $\mu$ m p-value=0,003), and density of alpha1a-AR staining (GII 121.38 vs. GIII 146.03 p-value=0.05) were statistically significant in regard of grade; and that the sum of density of GFAP (p-value=0.01) and the intensity of alpha1a-AR (p-value=0.01) were statistically significant in predicting survival.

**Conclusion:** These results suggest that some nuclear morphometrical features and the GFAP and alpha1a-AR immunofluorescence staining may be useful parameters for predicting survival in oligodendrogliomas.

**Keywords:** oligodendroglioma, nuclear morphometry, GFAP, alpha1a-AR, grading, prognosis, outcome survival