O10.02. MITOTIC INDEX, MICROVASCULAR PROLIFERATION AND NECROSIS DEFINE THREE GROUPS OF 1P/19Q CO-DELETED ANAPLASTIC OLIGODENDROGLIOMAS ASSOCIATED WITH DIFFERENT GENOMIC ALTERATIONS

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BACKGROUND: The aim of this study was to correlate histological features and molecular characteristics in anaplastic oligodendrogliomas (AO).

METHODS: The histological characteristics of 203 AO patients enrolled in the French national network POLA were analyzed. The genomic profiles of 191 cases were studied using genomic arrays. IDH mutational status was assessed by immunohistochemistry and direct sequencing. RESULTS: 1p/19q co-deletion was present in 79% of cases and was associated with alpha-internexin expression (p < 10^-4), IDH1/2 mutation (p < 10^-4), chromosome 4 loss (p < 10^-3), and better overall survival (p < 10^-4). Based on mitotic index, microvascular proliferation (MVP) and necrosis, 3 groups of 1p/19q co-deleted AO were identified: AO with more than 5 mitoses per 10-HPF, no MVP and no necrosis, (1), AO with MVP and no necrosis (2) and AO with MVP and necrosis (3). Compared to group 1, group 2 and 3 AO had a higher mean Ki-67 proliferation index and a higher rate of 9p and 9q losses. Compared to group 2, group 3 AO had a higher number of chromosomal alterations including chromosome 4 loss. In the subgroup of 157 1p/19q co-deleted AO, chromosomal instability was associated with shorter progression free survival (p = 0.024) and shorter overall survival (p = 0.023). CONCLUSIONS: The present study shows that oligodendroglioma with classic histological features remains a molecularly heterogeneous entity and should be stratified according to 1p/19q status because of its major prognostic relevance. Moreover, 1p/19q co-deleted AO are also heterogeneous. Interestingly, mitotic index, MVP and necrosis help to classify them into three groups associated with distinct genomic alterations.