Multicentric glioblastoma multiforme

see also Multifocal glioblastoma

Kong et al postulated that multicentric glioblastoma (GBM) represents more invasiveness form than solitary GBM and has their own genome characteristics. From May 2004 to June 2010 they retrospectively identified 51 treatment-naïve GBM patients with available clinical information from the Samsung Medical Center data registry. Multicentricity of the tumor was defined as the presence of multiple foci on the T1 contrast enhancement of MR images or having high signal for multiple lesions without contiguity of each other on the FLAIR image. Kaplan-Meier survival analysis demonstrated that multicentric GBM had worse prognosis than solitary GBM (median, 16.03 vs. 20.57 months, $p < 0.05$). Copy number variation (CNV) analysis revealed there was an increase in 11 regions, and a decrease in 17 regions, in the multicentric GBM. Gene expression profiling identified 738 genes to be increased and 623 genes to be decreased in the multicentric radiophenotype ($p < 0.001$). Integration of the CNV and expression datasets identified twelve representative genes: CPM, LANCL2, LAMP1, GAS6, DCUN1D2, CDK4, AGAP2, TSPAN33, PDLIM1, CLDN12, and GTPBP10 having high correlation across CNV, gene expression and patient outcome. Network and enrichment analyses showed that the multicentric tumor had elevated fibrotic signaling pathways compared with a more proliferative and mitogenic signal in the solitary tumors. Noninvasive radiological imaging together with integrative radiogenomic analysis can provide an important tool in helping to advance personalized therapy for the more clinically aggressive subset of GBM [1].

Case reports

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Schroeder et al report a case of multicentric glioblastoma multiforme (GBM) in which all 4 tumor foci were resected and evaluated using both comparative genomic hybridization array and RNA sequencing. Genetic analysis showed that the tumors shared a common origin, although each had its own unique set of genetic aberrations. The authors note that the genetic heterogeneity of multicentric GBM likely contributes to the failures of current treatments. The case underscores the necessity of increased genetic investigation [2].

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Kong DS, Kim J, Lee IH, Kim ST, Seol HJ, Lee JI, Park WY, Ryu G, Wang Z, Ma'ayan A, Nam DH. Integrative radiogenomic analysis for multicentric radiophenotype in glioblastoma. Oncotarget. 2016 Feb 1. doi: 10.18632/oncotarget.7115. [Epub ahead of print] PubMed PMID: 26863628.
2)
Schroeder B, Shah N, Rostad S, McCullough B, Aguedan B, Foltz G, Cobbs C. Genetic investigation of multicentric glioblastoma multiforme: case report. J Neurosurg. 2015 Oct 16:1-6. [Epub ahead of print] PubMed PMID: 26473785.