ABSTRACT

Radiology. 2022 Apr 12:211464. doi: 10.1148/radiol.211464. Online ahead of print.

MRI and Molecular Characterization of Pediatric High-Grade Midline Thalamic Gliomas: The HERBY Phase II Trial.

Rodriguez D(1), Calmon R(1), Aliaga ES(1), Warren D(1), Warmuth-Metz M(1), Jones C(1), Mackay A(1), Varlet P(1), Le Deley MC(1), Hargrave D(1), Cañete A(1), Massimino M(1), Azizi AA(1), Saran F(1), Zahlmann G(1), Garcia J(1), Vassal G(1), Grill J(1), Peet A(1), Dineen RA(1), Morgan PS(1), Jaspan T(1).

Author information:
(1)From the Department of Medical Physics and Clinical Engineering (D.R., P.S.M.) and Department of Radiology (R.A.D., T.J.), Nottingham University Hospitals Trust, Derby Rd, Nottingham NG7 2UH, England; Mental Health & Clinical Neurosciences Unit, University of Nottingham, Nottingham, England (D.R., R.A.D., P.S.M.); Department of Pediatric Radiology, Necker Enfants Malades Hospital, Assistance Publique-Hôpitaux de Paris, Paris, France (R.C.); Department of Radiology & Nuclear Medicine, VU University Medical Center, Amsterdam, the Netherlands (E.S.A.); Department of Radiology, Leeds Teaching Hospitals, Leeds, England (D.W.); Institute for Diagnostic and Interventional Neuroradiology, Würzburg University, Würzburg, Germany (M.W.M.); Divisions of Molecular Pathology and Cancer Therapeutics, The Institute of Cancer Research, London, England (C.J., A.M.); Department of Pathological Anatomy and Cytology, Centre Hospitalier Sainte Anne, Paris, France (P.V.); Department of Biostatistics, Centre Oscar Lambret, Lille, France (M.C.L.D.); Department of Haematology and Oncology, Great Ormond Street Hospital, London, England (D.H.); Pediatric Oncology and Hematology Unit, Hospital La Fe, Valencia, Spain (A.C.); Pediatric Oncology Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy (M.M.); Division of Neonatology, Pediatric Intensive Care and Neuropediatrics, Medical University of Vienna, Vienna, Austria (A.A.A.); Auckland Radiation Oncology, Auckland City Hospital, New Zealand. (F.S.); F. Hoffmann-La Roche, Basel, Switzerland (G.Z., J. Garcia); Department of Pediatric and Adolescent Oncology and Unit 981 from the Institut National de la Santé et de la Recherche Médicale, Gustave Roussy, Université Paris-Saclay, Université Paris-Sud, Villejuif, France (G.V., J. Grill); and Institute of Cancer and Genomic Sciences, University of Birmingham, and Birmingham Children's Hospital, Birmingham, England (A.P.).

Comment in
Radiology. 2022 Apr 12;:213002.

Background Diffuse midline gliomas (DMG) are characterized by a high incidence of H3 K27 mutations and poorer outcome. The HERBY trial has provided one of the largest cohorts of pediatric DMGs with available radiologic, histologic-genotypic, and survival data. Purpose To define MRI and molecular characteristics of DMG. Materials and Methods This study is a secondary analysis of a prospective trial (HERBY; ClinicalTrials.gov identifier, NCT01390948) undertaken between October 2011 and February 2016. Among 121 HERBY participants, 50 had midline nonpontine-based tumors. Midline high-grade gliomas were reclassified into DMG H3 K27 mutant, H3 wild type with enhancer of zest homologs inhibitory protein overexpression, epidermal growth factor receptormutant, or not otherwise stated. The epicenter of each tumor and other radiologic characteristics were ascertained from MRI and correlated with the new subtype classification, histopathologic characteristics, surgical extent, and outcome parameters. Kaplan-Meier curves and log-rank tests were applied to determine and describe survival differences between groups. Results There were 42 participants (mean age, 12 years ± 4 [SD]; 23 girls) with radiologically evaluable thalamic-based DMG. Eighteen had partial thalamic involvement (12 thalamopulvinar, six anteromedial), 10 involved a whole thalamus, nine had

unithalamic tumors with diffuse contiguous extension, and five had bithalamic tumors (two symmetric, three partial). Twenty-eight participants had DMG H3 K27 mutant tumors; there were no differences in outcome compared with other DMGs (n = 4). Participants who underwent major debulking or total or near-total resection had longer overall survival (OS): 18.5 months vs 11.4 months (P = .02). Enrolled participants who developed leptomeningeal metastatic dissemination before starting treatment had worse outcomes (event-free survival, 2.9 months vs 8.0 months [P = .02]; OS, 11.4 months vs 18.5 months [P = .004]). Conclusion Thalamic involvement of diffuse midline gliomas ranged from localized partial thalamic to holo- or bithalamic with diffuse contiguous spread and had poor outcomes, irrespective of H3 K27 subtype alterations. Leptomeningeal dissemination and less than 50% surgical resection were adverse risk factors for survival. Clinical trial registration no. NCT01390948 © RSNA, 2022 Online supplemental material is available for this article. See also the editorial by Widjaja in this issue.

DOI: 10.1148/radiol.211464
PMID: 35412366