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A comprehensive multicenter analysis of clinical, molecular, and imaging characteristics and outcomes of H3 K27–altered diffuse midline glioma in adults

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Abstract

Objective: The objective was to comprehensively investigate the clinical, molecular, and imaging characteristics and outcomes of H3 K27-altered diffuse midline glioma (DMG) in adults.

Methods: Retrospective chart and imaging reviews were performed in 111 adult patients with H3 K27-altered DMG from two tertiary institutions. Clinical, molecular, imaging, and survival characteristics were analyzed. Characteristics were compared between adult and 365 pediatric patients from a previous multicenter meta-analysis dataset. Cox analyses were performed to determine predictors of overall survival (OS) in adult patients.

Results: The median (range) age of adult patients was 40 (18-75) years, and 64 males and 47 females were included. Adults had a higher male proportion (57.7% vs 45.3%, $p = 0.023$), lower proportion of histological grade 4 (41.4% vs 74.0%, $p < 0.001$), and different tumor locations ($p < 0.001$) compared with pediatric patients; adults commonly showed a thalamus location (41.5%) followed by the spinal cord (27.0%), whereas pediatric patients predominantly showed a pons location (64.9%). The OS of adults was longer than that of pediatric patients (30.3 vs 12.0 months, $p < 0.001$, log-rank test). Older age at diagnosis (HR 0.96, $p = 0.001$), histologically lower grade (HR 0.25, $p = 0.003$), and gross-total resection of nonenhancing tumor (HR 0.15, $p = 0.003$) were independent favorable prognostic factors.

Conclusions: Adult patients with H3 K27-altered DMG showed distinct clinical, histological, and imaging characteristics compared to pediatric counterparts, with a significantly better prognosis. The authors' results suggest that aggressive surgery should be pursued when deemed feasible for better survival outcomes.

Keywords: H3 K27; diffuse midline glioma; magnetic resonance imaging; survival; tumor.