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Late-onset lymphopenia during radiation is associated with an increased risk of tumor recurrence in newly diagnosed pediatric medulloblastoma

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Abstract

Background: Recent data found a correlation between lymphopenia occurring early during craniospinal radiation therapy (RT) and risk of disease recurrence in newly diagnosed childhood medulloblastoma. However, the population included patients who received chemotherapy prior to or during RT. Here, we investigate the effect of lymphopenia during RT in patients with newly diagnosed pediatric medulloblastoma who were chemotherapy-naïve.

Procedure: We analyzed 79 patients with newly diagnosed medulloblastoma (ages 2-21 years) treated between 1997 and 2013 with craniospinal RT. Log-rank tests were used to determine survival differences, and Cox proportional hazards regression was used to assess associations between patient characteristics and lymphopenia with disease recurrence risk.

Results: Eighty-three percent of patients (62/75) had grade ≥ 3 lymphopenia by RT Week 3, with 95% developing grade ≥ 3 lymphopenia at some point during therapy. There was no difference in incidence of lymphopenia between those who received proton beam RT (93%) versus photon (97%). Twenty-four of 79 (30%) patients developed disease recurrence at an average 27.0 months after diagnosis. There was higher risk of disease recurrence in patients with grade ≥ 3 lymphopenia during RT Week 4 (log-rank $p = .016$; Cox $p = .03$) and Week 5 (log-rank $p = .024$; Cox $p = .032$); after adjusting for clinical risk group, only grade ≥ 3 lymphopenia at Week 4 remained prognostic (Cox $p = .04$). No correlation was found between risk of tumor recurrence and early lymphopenia (RT Weeks 0-3) or absolute lymphocyte count (ALC) below the median at any time during RT.

Conclusions: Lymphopenia during RT Weeks 4 and 5 correlates with increased risk of tumor recurrence in pediatric patients with newly diagnosed medulloblastoma.

Keywords: lymphopenia; pediatric medulloblastoma; radiation; recurrence risk.

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