

## Neurocognitive, Emotional, and Quality of Life Outcomes in Survivors of Pediatric Acute Myeloid Leukemia: A Report from the Childhood Cancer Survivor Study (CCSS)

**Background:** Survivors of childhood Acute Myeloid Leukemia (AML) are vulnerable to medical late-effects of treatment; however, less is known about the psychological outcomes of AML survivors who do and do not receive bone marrow transplantation (BMT).

**Objective:** To evaluate neurocognitive, emotional and quality of life (QOL) outcomes in 5-year survivors of pediatric AML treated with BMT versus intensive chemotherapy (IC) relative to a sibling comparison group.

**Methods:** Survivors treated with BMT (N=186; 51% female; mean[SD] age = 30.2[7.3]; 50% received total body irradiation) or IC (N= 343; 51% female; age = 29.2[7.3]) who participated in the CCSS, were compared with siblings (N= 3289; 52% female; age = 32.7[8.8]) for neurocognitive deficits (CCSS Neurocognitive Questionnaire), emotional distress (Brief Symptom Inventory-18) and health-related QOL (Short-Form 36). Outcomes were dichotomized as impaired vs. non-impaired (impairment defined as scores >90<sup>th</sup> percentile for neurocognitive and emotional symptoms and <16<sup>th</sup> percentile for QOL). Multivariable Poisson regression models estimated relative risks (RRs), adjusted for age and sex, with robust variances to account for intra-family correlations.

**Results:** Compared to siblings, AML survivors were more likely to report impairment in  $\geq 1$  domain of neurocognitive (47.3% vs. 27.9%, RR 1.7, 95% CI= 1.4-2.0), emotional (18.6% vs. 12.6%, RR 1.5, 95% CI 1.2-1.8) and quality of life (47.3% vs. 32.3%, OR 1.85, 95% CI 1.39-2.46) function. Survivors had an increased RR compared to siblings for impairments in all neurocognitive domains: working memory (27.9% vs. 11.4%, RR 2.4, 95% CI= 1.7-3.3), organization (22.7% vs. 16.2%, RR 1.4, 95% CI 1.1-1.9), emotion regulation (17.4% vs. 8%, RR 2, 95% CI= 1.4-2.9) and task completion (30.8% vs 13.7%, RR 2.2, 95% CI= 1.6-2.9). Survivors treated with BMT were at higher risk for depression (14.6% vs. 8.0%, RR 1.9, 95% CI= 1.1-3.3) compared to IC. No other significant differences were observed.

**Conclusion:** AML survivors are at increased risk for neurocognitive impairments, emotional distress, and poorer quality of life; however, differences between the BMT and IC groups were minimal. As treatment for AML continues to rely on BMT for a subgroup of patients, our results are reassuring that improved oncology outcomes from BMT do not appear to come at the cost of increased neurocognitive or QOL impairments.

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