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NEUROCOGNITIVE IMPAIRMENT AND FUNCTIONAL INDEPENDENCE IN ADULT SURVIVORS OF CHILDHOOD MEDULLOBLASTOMA: A REPORT FROM THE CHILDHOOD CANCER SURVIVOR STUDY (CCSS)

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Background and Aims

Survivors of childhood medulloblastoma are at risk of developing chronic health conditions (CHCs) and neurocognitive late effects secondary to their tumor and intensive multimodal therapies. The contribution of these morbidities to attainment of functional independence in adulthood has not previously been examined.

Methods

505 adult survivors of medulloblastoma (58% male, median [min-max] 7 [0-20] years at diagnosis, 29 [18-46] years at evaluation) completed the CCSS Neurocognitive Questionnaire (impairment: scores> 90th %ile of siblings). Treatment exposures were categorized as surgery + craniospinal irradiation (CSI)<30Gy (± chemotherapy); surgery + CSI≥30Gy (no chemotherapy); or surgery + CSI≥30Gy + chemotherapy. Self-reported CHCs were graded using NCI's CTCAE v4.3. Latent class analysis utilized five indicators (employment, marital status, independent living, driver's license, assistance with routine/personal care needs) to identify mutually exclusive groups of functional independence. Multivariable modified Poisson regressions examined relative risk (RR) of neurocognitive impairment between the groups, adjusting for sex, race, age at diagnosis, and age at assessment. Path analysis examined the impact of treatment on functional independence, mediated by Grade 2-4 CHCs and/or neurocognitive impairment.

Results

Three latent groups of survivors varying in functional independence were identified: independent (37%), moderately independent (non-independent living and unmarried; 21%), and non-independent (42%). Survivors with impaired task efficiency (RR=1.83, 95% CI, 1.37-2.45), organization (RR=1.33, 95% CI, 1.09-1.61), and emotional regulation (RR=1.26, 95% CI, 1.03-1.55) were at elevated risk for being non-independent compared to independent. Path analysis revealed no direct or indirect paths from treatment exposures to non-independence through neurocognitive impairment and/or CHCs. There were, however, significant direct paths from impaired organization (β=0.23, p=0.013) and stroke/seizure (β=0.47, p<0.001) to non-independence.

Conclusions

Neurocognitive impairment and neurologic sequelae in medulloblastoma survivors contribute to reduced independence in adulthood, irrespective of past treatment exposures. Functional rehabilitation efforts following seizures/strokes and interventions for neurocognitive deficits may promote attainment of independence in long-term survivors of medulloblastoma.

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