Submission category: Neuropsychology, Quality of Life, Survivorship

Abstract Title (75 word limit): Excess morbidity and mortality in middle-aged adult survivors of pediatric medulloblastoma: model-based estimates

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Abstract Body (words 298; word limit 300):

Background: Medulloblastoma therapy has evolved from surgery and radiation (1970s) to the addition of adjuvant chemotherapy (1980s) and risk-stratified radiation (1990s) with improved five-year survival. Characterization of late-effects risks across the lifespan are limited by follow-up time and can be estimated with simulation modeling.

Objective: To estimate long-term survival and central nervous system (CNS) late-effects into adulthood among 5-year pediatric medulloblastoma survivors.

Methods: Using the Cancer Outcomes Microsimulation: Pediatric and Adolescent SurvivorShip (COMPASS) model based on data from the Childhood Cancer Survivorship Study and population-based databases, we estimated survival, cumulative mortality associated with recurrence/progression, and cumulative incidence of subsequent malignant glial tumors and stroke among 5-year medulloblastoma survivors. Subgroups were defined by diagnosis era: 1970s (n=102; mean follow-up age=34.7 years), 1980s (n=307; 30.7 years), and 1990s (n=515; 24.9 years). We conducted 1,000 simulations and report mean and 95% uncertainty intervals.

Results: Among all 5-year medulloblastoma survivors, 82.8% (95% UI, 80.0-85.2) were alive at age 25 compared to 46.2% (34.7-56.7) at age 50. Cumulative recurrence/progression-related mortality at age 50 was 11.7% (9.2-14.1), with >90% occurring before age 25. At age 50, the cumulative incidence was 19.8% (12.2-27.0) for glial tumors and 26.9% (16.2-41.3) for stroke. Estimates appeared to increase by treatment era (glial tumors: 14.7% [5.8-25.6] in 1970s vs. 18.0% [10.0-26.2] in 1980s vs. 22.0% [13.2-30.3] in 1990s; stroke: 23.7% [10.8-38.8] in 1970s vs. 26.0% [15.0-39.7] in 1980s vs. 28.0% [16.1-43.5] in 1990s), reflecting changes in treatment exposures and competing risk, albeit with considerable uncertainty.

Conclusion: Five-year medulloblastoma survivors are projected to have high risk of morbidity and mortality as they age, with less than half living to age 50. After age 25, estimated morbidity and mortality are driven by non-relapse late-effects, underscoring a need for standardized screening and approaches for early detection/prevention of late-effects for this vulnerable population.