ABSTRACT

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Neurocognitive function and survival in children with average-risk medulloblastoma treated with hyperfractionated radiation therapy alone: Long-term mature outcomes of a prospective study.

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BACKGROUND: The purpose of this study was to report long-term neurocognitive and clinical outcomes in children treated for average-risk medulloblastoma with hyperfractionated radiation therapy (HFRT) alone.

METHODS: Between 2006 and 2010, 20 children with rigorously staged average-risk medulloblastoma were treated on a prospective study with HFRT without upfront adjuvant systemic chemotherapy after written informed consent. HFRT was delivered as twice-daily fractions (1 Gy/fraction, 6-8 hours apart, 5 days/week) to craniospinal axis (36 Gy/36 fractions) plus conformal tumor-bed boost (32 Gy/32 fractions). Neurocognitive function was assessed at baseline and periodically on follow-up using age-appropriate intelligence quotient (IQ) scales.

RESULTS: Median age was 8 years (range 5-14 years) with 70% being males. Mean and standard deviation (SD) scores at baseline were 90.5 (SD = 17.08), 88 (SD = 16.82) and 88 (SD = 17.24) for Verbal Quotient (VQ), Performance Quotient (PQ), and Full-Scale IQ (FSIQ) respectively. Mean scores remained stable in the short-to-medium term but declined gradually beyond 5 years with borderline statistical significance for VQ (P = .042), but nonsignificant decline in PQ (P = .259) and FSIQ (P = .108). Average rate of neurocognitive decline was <1 IQ point per year over a 10-year period. Regression analysis stratified by age, gender, and baseline FSIQ failed to demonstrate any significant impact of the tested covariates on longitudinal neurocognitive function. At a median follow-up of 145 months, 10-year Kaplan-Meier estimates of progression-free survival and overall survival were 63.2% and 74.1% respectively.

CONCLUSION: HFRT alone without upfront adjuvant chemotherapy in children with average-risk medulloblastoma is associated with modest decline in neurocognitive functioning with acceptable long-term survival outcomes and may be most appropriate for resource-constrained settings.

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