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Does quality of radiotherapy predict outcomes of pediatric multicenter cooperative group trials? A systematic review

Alysa Fairchild, A Fairchild, A Lim and S Patel University of Alberta, Canada

Introduction & Aim: Radiotherapy (RT) and quality assurance (QA) programs aim to standardize RT delivered on multicenter clinical trials to minimize variables that may confound the validity of results. Our objective was to review available evidence for correlation of RT quality with clinical outcomes within pediatric multicenter clinical trials.

Methods: A Medline, Embase and Cochrane Central Register of Controlled Trials literature search was performed restricted to English but with no date limits. Candidate studies accrued children with age <21 years or median age <15, were led by any cooperative group, published in full and described central subjective ± objective assessment of RT protocol compliance (quality). Data abstracted included assignment of violations in relation to clinical outcomes (locoregional and/or distant failure, progression-free survival [PFS], overall survival [OS]).

Results: 27 multicenter studies described in 26 articles met inclusion criteria. Disease sites were medulloblastoma (M; 9 trials), rhabdomyosarcoma (RMS; 7), Hodgkin's (H; 4) Supratentorial Primitive Neuroectodermal tumor (SPNET; 3), Ewing's (E; 3) and Acute Lymphocytic Leukemia (ALL; 1). Deviations were found in 0-77% of RT plans reviewed. 10/27 reported that dose and/or field deviations significantly affected clinical outcomes in the form of inferior overall survival (N=1), PFS (4), local PFS (1), local control (3) and any recurrence (1). One study suggested improved PFS with local field RT deviations versus without. Studies reporting a significant relationship between RT quality and clinical outcomes were: 4 M, 3 SPNET, 2 H, 1 E and 1 RMS.

Conclusions: Overall, the weight of the evidence suggests that suboptimal RT negatively impacts clinical outcomes in pediatric multicenter and cooperative group trials.

Hypothesis: The hypothesis is that radiotherapy not delivered in accordance with study protocol specifications leads to worse clinical outcomes.

Biography

Alysa Fairchild is currently working in the Department of Radiation Oncology at University of Alberta, Canada. His research interest are radiotherapy, pediatric radiation therapy and radiation oncology etc.

alysa.fairchild@albertahealthservices.ca

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