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612.ACUTE LYMPHOBLASTIC LEUKEMIAS: CLINICAL AND EPIDEMIOLOGICAL

Frailty in Children and Adolescents with Lymphoblastic Leukemia or Lymphoma Receiving Maintenance Chemotherapy - a Pilot Study

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Background: Increased survivorship of childhood cancer has revealed a number of long-term morbidities related to treatment. Evidence suggests that cancer and its treatment may accelerate normal loss of physiologic capacity that occurs during aging.The advanced physiologic aging and related morbidities often seen in childhood cancer survivors suggests that these patients may present with signs of early-onset frailty. Frailty is a measure of global infirmity and impaired physical function and has been correlated with adverse health outcomes and elevated incidence of mortality in the general population. Research into the incidence and applicability of the frailty phenotype in children being treated for cancer may aid in the identification of the most vulnerable patients and identify those who may require intervention. The purpose of this study is to explore the frailty phenotype in children and adolescents receiving maintenance chemotherapy for acute lymphoblastic leukemia or lymphoma.

Methods: We prospectively recruited children and adolescents (aged 5-18 years-old) diagnosed with acute lymphoblastic leukemia or lymphoma in the first cycle of their maintenance chemotherapy. Frailty was assessed twice: at an initial visit in cycle 1 maintenance treatment (V1), and 6-months following the initial assessment (V2). The frailty phenotype consists of 5 domains, which were assessed using developmentally appropriate measures: 1) Slowness: 6-minute walk test; 2) Weakness: Handgrip strength dynamometry - calibrated to the size of the participant's hand; 3) Exhaustion/Fatigue: The PedsQL ™ Multidimensional Fatigue Scale; 4) Body Composition: InBody 270 body composition analyzer; and 5) Physical activity/Energy expenditure: Self-administered physical activity questionnaire for older children (PAQ-C) and physical activity questionnaire for adolescents (PAQ-A).Each assessment was scored individually and "Frailty points" were assigned based on age and sex-based normative z-scores or survey scores, and a composite "Frailty Score" ranging from 0=least frail to 25=most frail. Wilcoxon signed-rank test was used to compare V1 and V2 frailty scores.

Results:The analysis sample consisted of 19 participants (mean age 9.1 [SD=3.4] years old; 63% female) who completed V1 and 7 participants that completed V2. Diagnoses of participants who completed V1 include precursor B-Cell acute lymphoblastic leukemia (n=15), T-Cell acute lymphoblastic leukemia (n=3), and T-Cell lymphoblastic Lymphoma (n=1). Median V1 z-scores and survey scores per domain are as follows: Slowness: z-score -3.11 [-4.02, -2.48]; Weakness: z-score -1.48 [-2.06, -1.38]; Exhaustion/Fatigue: score 58.3 [46.5, 70.8]; Body composition: z-score (total body fat) 0.90 [0.47, 1.79]; Physical activity/Energy expenditure: score 2.26 [1.73, 2.54]. Domain specific frailty score for V1 are displayed in Figure 1. Of the 7 participants with a V2 frailty assessment, paired analysis demonstrated significant improvement in Exhaustion/Fatigue (median score V1=56.94, V2=70.83 [p=0.016]). However, improvements in weakness, body composition, and physical activity/energy expenditure did not reach statistical significance. Median slowness z-scores at V2 were similar to V1. Median composite frailty score improved from 12 to 11 in V2 but was not statistically significant (p=0.054). Comparison of V1 and V2 overall composite scores are displayed in Figure 2.

Conclusion: Children and adolescents receiving maintenance chemotherapy for acute lymphoblastic leukemia or lymphoma scored poorly in all five domains of frailty. We observed some improvements in exhaustion/fatigue, and trending improvements in subdomain and composite frailty scores in the small sample of participants with V1 and V2 assessments. Given that frailty has been shown to persist into adulthood in survivors of childhood cancer, the frailty assessment may be an effective tool for identifying patients who may require additional intervention. Initial and follow-up frailty measurements for this study are currently ongoing.

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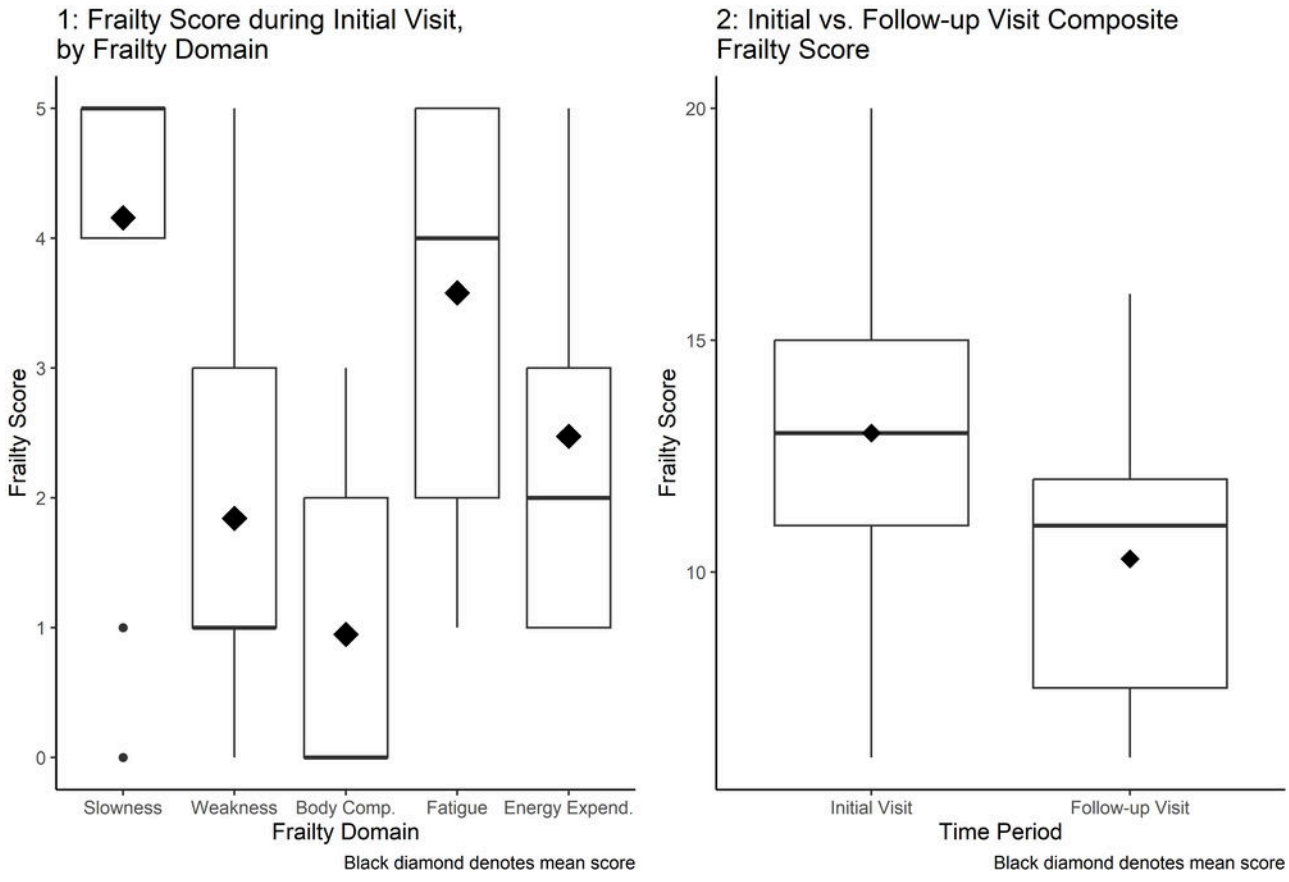

Figure 1

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