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abstract

Changes in Height and Body Mass Index in Children Undergoing Chemotherapy for Acute Lymphoblastic Leukemia

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Changes in Height and Body Mass Index in Children Undergoing Chemotherapy for Acute Lymphoblastic Leukemia

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Introduction: The objective was to investigate the impact of chemotherapy on changes in height and BMI of pediatric acute lymphoblastic leukemia patients from diagnosis to two years post-treatment.

Methodology: A total of 805 pediatric acute lymphoblastic leukemia (ALL) patients diagnosed between January 1, 2015, and May 1, 2021, at Zhejiang University School of Medicine Children's Hospital Hematology Oncology Department were included. Height and weight data were collected at diagnosis and at 3-, 6-, 9-, 12-, 18-, and 24-months post-treatment. SPSS was utilized to analyze changes in height and BMI z-scores and their relationship with clinical characteristics at each observation point.

Results: Overall height z-scores post-treatment were significantly lower than at diagnosis ($P < 0.001$), with the most significant decline observed in the first three months of treatment. Some catch-up growth was noted nine months post-treatment. Patients ≤ 6 years old at diagnosis showed significant catch-up growth and eventually achieved higher height z-scores ($P < 0.05$), whereas height z-scores decreased most significantly in patients aged 8–13 years ($P < 0.05$). High-risk patients had lower height z-scores at 9- and 12-months post-treatment compared to low- and intermediate-risk groups ($P < 0.01$).

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No significant differences were observed in height z-scores by gender ($P>0.05$). Overall BMI z-scores were significantly higher than at diagnosis ($P<0.001$). The proportion of overweight/obese patients increased from 13.54% at diagnosis to 39.39% at 24 months post-treatment, with the most significant increase occurring in the first three months of treatment. Subgroup analyses showed greater increases in BMI z-scores in children $\leq 8-9$ years old ($P<0.05$), with no significant differences related to gender or risk category.

Conclusion: Chemotherapy induces height deficits and BMI increases during treatment in pediatric ALL patients. Height deficits were more pronounced in patients aged 8–13 years, and BMI increases were more significant in patients $\leq 8-9$ years old. Changes in height and BMI were not associated with gender.