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Long-term catch-up growth and risk factors for short adult height after pediatric liver transplantation

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Introduction: Children who require liver transplantation (LTx) for end-stage liver disease generally have severe growth retardation. After LTx, recipients experience catch-up growth (CUG), though there are not a few cases resulting in short adult height. The aim of the study was to determine decades-long CUG trends and risk factors for short adult height after pediatric LTx.

Methods: We examined long-term trends of height Z-score (normalized with the mean of the values is 0 and the standard deviation is 1 using age- and sex-specific references for the general population) in a single-center retrospective cohort of 117 pediatric LTx recipients survived >5 years. The risk factor analysis for short adult height were performed on 75 patients who reached adult height.

Results: The median age at LTx was 1.3 years and most primary diagnoses were biliary atresia (77%). Mean height Z-score of pre-LTx and 1, 2, 5 and 8 years after LTx were -2.26, -1.59, -0.91 and -0.59, respectively. After that point, the data plateaued until 20 years. Mean final adult height Z-score was -0.87. In the multivariate analysis, older age at LTx (odds ratio [OR] 1.22 by 1 year, 95% confidence interval [CI] 1.06-1.40, $p = 0.002$), lower height Z-score at LTx (OR 0.46 by 1 point, 95% CI 0.29-0.71, $p < 0.001$) and post-LTx hospital stay 60 days (OR 4.95, 95% CI 1.26-19.42, $p = 0.015$) were identified as independent risk factors for short adult height.

Conclusion: Marvelous CUG was observed after LTx, nevertheless the final adult height was inadequate. For healthy physical growth, LTx should be performed as young as possible and without severe growth retardation, and if growth is inadequate after LTx, use of recombinant human growth hormone might need to achieve proper adult height.