Three-year efficacy and safety of LB03002, a once-weekly sustained-release growth hormone (GH) preparation, in prepubertal children with GH deficiency (GHD)

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Background: The availability of a GH depot preparation might considerably improve the management of children on GH therapy. LB03002 is a novel once-weekly sustained-release formulation of recombinant human GH (rhGH) that could potentially offer patients and caregivers a suitable alternative to daily subcutaneous injections. The aim of this study was to explore the optimal LB03002 dose to stimulate long-term longitudinal growth and to establish the long-term safety profile of the compound.
Methods: GH-naive prepubertal GH-deficient children were randomized to four groups who received: (1) 0.2 mg/kg/week LB03002 for 12 months, followed by 0.5 mg/kg/week for another 24 months (n = 13); (2) 0.5 mg/kg/week LB03002 for 36 months (n = 13); (3) 0.7 mg/kg/week LB03002 for 12 months, followed by 0.5 mg/kg/week for another 24 months (n = 13), or (4) conventional therapy with daily GH 0.03 mg/kg/day for 24 months, switched to 0.5 mg/kg/week LB03002 for 12 months (n = 12). Height measurements were taken at baseline and after 6, 12, 24, and 36 months, and height and height velocity were calculated.
Results: During the first 12 months of treatment, catch-up growth was observed in all treatment groups, with a dose-dependent pattern of response in the three LB03002 groups. Whereas patients treated with the lower dose of LB03002 showed a reduced growth response in comparison with those receiving daily GH injections, the growth responses for the 0.5 and 0.7 mg/kg/week LB03002 groups were comparable to the daily GH group during the first year. There were no significant differences in height SD score gain between any groups at 24 and 36 months. Bone maturation and IGF-I levels did not differ for any LB03002 dose compared with daily GH. No significant change in mean fasting glucose and glycosylated hemoglobin concentrations was observed in any treatment group at any time.
Conclusions: LB03002 treatment of prepubertal GHD children for up to 3 years resulted in an efficacy and safety profile that did not differ from that of conventional daily GH regimen. 0.5 mg/kg/week appeared to be the optimal dose for long-term treatment.

Long-term GH therapy in children is currently based on daily subcutaneous injections, which makes it cumbersome for patients and their caregivers, leading to a reduced adherence to treatment and potentially affecting the long-term growth response. Pharmaceutical research in this field has been focusing on the development of GH depot preparations to be given once or twice weekly. A previous depot GH preparation tested over a period of 1 year did not provide satisfactory results in comparison with the conventional daily therapy [14]. LB03002 is a novel once-weekly sustained-release formulation of recombinant human GH (rhGH), manufactured using the yeast *Saccharomyces cerevisiae* as the expression system, contained in sodium hyaluronate microparticles, which are suspended in medium-chain triglycerides before injection. This is the first study reporting on the efficacy and safety of LB03002 administered once per week over a period of 3 years. These preliminary data look promising, showing a growth response and safety profile comparable to conventional daily therapy. However, this study was designed as a dose-finding study, and thus, the overall number of treated patients was small, and follow-up limited to 36 months. Therefore, data on adult height and longer safety assessment are needed before drawing any conclusions.