GROWTH AND DEVELOPMENT

Growth hormone therapy improves cognition in children with Prader–Willi syndrome

Treatment with growth hormone (GH) prevents cognitive deterioration and improves abstract reasoning and visuospatial skills in children with Prader–Willi syndrome (PWS), according to a group of Dutch researchers.

Previous reports showed that GH therapy improves cognition in infants and adults with PWS, as well as in children with GH deficiency, children born small for gestational age and children with Down syndrome. However, the effects of >6 months of GH treatment in children with PWS were unknown.

The researchers designed a two-part study to assess the effects of GH therapy on cognition in prepubertal children with a genetically confirmed diagnosis of PWS and no previous exposure to this type of therapy. The study population consisted of 50 patients (21 boys aged 3–14 years and 29 girls aged 3–12 years). The first part of the study was a 2-year randomized controlled trial, in which the children received either 1.0 mg/m² of biosynthetic GH daily or no GH therapy. The second part of the study was an analysis of the effects of 4 years of GH therapy: children who received GH during the first part of the study continued the therapy for an additional 2 years, whereas children still naive to GH therapy were treated for 4 years after the first part of the study had finished. The researchers measured the children's cognitive function every 2 years, using short versions of the WISC–R intelligence scale subtests for children aged >7 years and short versions of

WPPSI–R intelligence scale subtests for children aged <7 years. Both scales include the vocabulary and similarities subtests, which assess verbal IQ and abstract verbal reasoning, respectively, and the block design subtest, which assesses visuospatial skills; in addition, the WISC–R includes a picture arrangement subtest and the WPPSI–R includes a picture completion subtest, both of which assess performance IQ. These tests were also the basis for calculating participants' total IQ scores.

The mean subtest scores and total IQ scores of children who received GH therapy were similar at baseline and after 2 years of therapy. However, children who did not receive GH had lower scores after 2 years of study than at baseline, particularly in measures of verbal cognitive function. This finding indicates a deterioration of cognition in the absence of GH therapy.

After 4 years of GH therapy, the children's performance on the similarities and block design subtests had significantly improved from baseline. Of note, participants' scores on these subtests were closer to age-matched population norms at the end of the study than at baseline. Furthermore, children with low baseline scores on these subtests displayed the greatest cognitive improvements with GH therapy. Finally, children who started GH therapy at a young age had higher scores on the block design and vocabulary subtests at the end of the study than children who started therapy when they were older.

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“Our findings might suggest that GH should best be administered at an early age to prevent deterioration of cognitive functioning in children with PWS,” conclude the researchers, “but that GH treatment also induces a catch-up in cognitive skills in children with PWS who lag behind [their disease-free peers], even when they start at an older age”.

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