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Editorial

Growth Hormone Treatment in Children: Indications and Controversies

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Received: January 16, 2017; **Published:** January 25, 2017

The structure of growth hormone (GH) is formed by a chain of 191 amninoacids with molecular weight of 22 Kda and is located in the anterior hypophisis. The first GH was animal origin (inactive in human). In 1956, the extraction of GH from the hypophisis of human dead body was done, but because of record of many cases of Creutzfeldt-Jakob disease, the medical international community decided to stop using this drug .The first recombinant GH was used only in 1985.

Growth hormone treatment has universal acceptance in cases like, GH deficiency congenital or adquired, total or partial type, with known or unknown etiology, neurosecretory disfunction and bioinactive GH. In those case that GH showed normal respond after stimulation test, GH is used to increase the final stature with acceptable results in Turner syndrome, babies born small for gestational age and chronic renal insufficiency before renal transplant. In Laron nanism, chronic treatment with steroids, liver failure, Alagille syndrome and idiopathic short stature, the use of GH has some or no results. In familial short stature ,constitutional short stature, Down syndrome, Noonan syndrome, Prader-Willi syndrome, precocious puberty treated with GnRh analogues, bone dysplasia, osteogenesis imperfecta and cystic fibrosis, no results were found after using GH treatment. Growth hormone is also used in anabolic situations such as chronic pulmonar obstructive disease, sepsis, severe burn, Aids, malnutrition, caquexia, sport and severe trauma but in all cases can cause many side effects. Growth hormone can be used as lipolytic effect in obesity and Prader-Willi syndrome.

What are the recomended doses? For GH deficiency: 25 - 35 µg/kg/day, Turner syndrome: 45 - 55 µg/kg/day, small for gestational age: 33 µg/kg/day, Prader-Willi: 25 µg/kg/day and idiopathic short stature:40 µg/kg/day.The dose is use daily before bedtime, by subcutaneous administration, because is more physiologic (Figure 1). When the growth velocity has weak respond, the normal tendency is to increase the dosage. This is an error procedure because increase the risk of side effects.

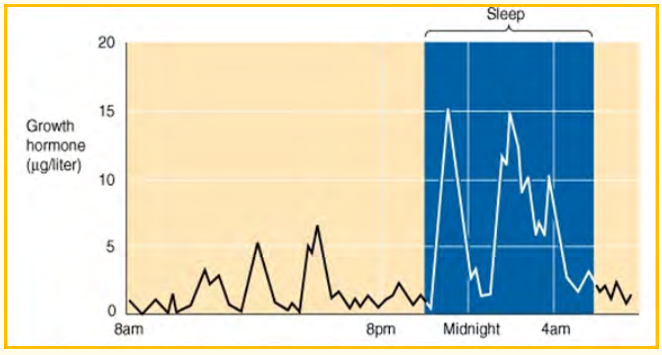

Figure 1: *The reason to use GH before bedtime.*

We control the treatment with measure of the height and checking the growth velocity every 4 months and evaluate the bone age every year. Is considered good response to treatment when the growth is more than 2 cm compared with the previous stature before treatment.

The growth velocity increase more in the first year of treatment (Figure 2). After, the growth drop in the following years, but is higher than the growth velocity before the start of GH therapy. As sooner as you start the treatment, the better will be the catch-up growth. The bone age advance at the same time or a little slowly than the chronologic age.

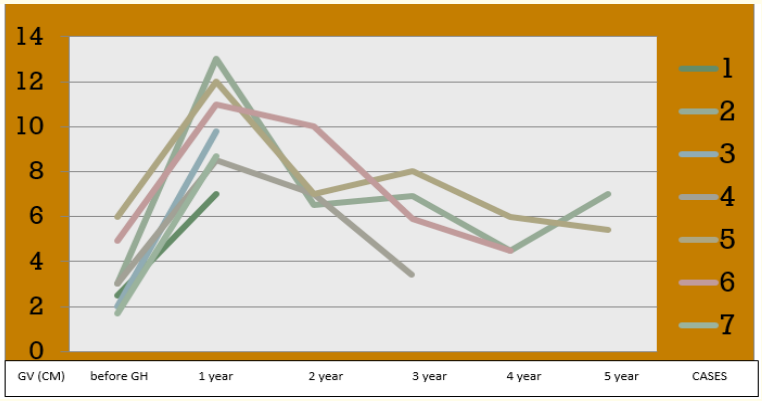

Figure 2: *Growth velocity increase more in the first year of treatment.*

The growth velocity increase more in the first year of treatment (Figure 2). After, the growth drop in the following years, but is higher than the growth velocity before the start of GH therapy. As sooner as you start the treatment, the better will be the catch-up growth. The bone age advance at the same time or a little slowly than the chronologic age.

The prognosis of the treatment is difficult to stablish because some factors can be responsible for positive (bone age<<<chronology age) or negative final height, particularly puberty and subnutrition.

When we stop the treatment? In boys with more than 14 years of bone age and in girls with more than 15 years of bone age or when the growth velocity is less than 2 cm/year in 4/4 months consecutives measures.

Treatment of children and adolescents with growth hormone for idiopathic short stature (ISS) is controversial. These patients often have normal growth velocity (often near or at the lower limit of normal), no biochemical or other evidence for a specific growth-restricting condition and have normal results of growth hormone stimulation tests. The indication is for children with current height below -2.25 standard deviations (SD) of the mean, in whom the epiphyses are not closed, and the expected adult height (based on bone age) is below the normal range. This corresponds to an adult height less than 160 cm for males and 150 cm for females. A consensus guideline concluded that the optimal age for initiating growth hormone therapy is between age five and early puberty. We continue the treatment, only if the height velocity increases by at least 2.5 cm/year above the baseline height velocity after one year of treatment.

Volume 3 Issue 4 January 2017