



# The growth characteristics of patients with Noonan syndrome, and first two years results of GH treatment: A Nationwide multicenter study



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## Introduction:

Short stature is a common manifestation of Noonan syndrome (NS). Growth hormone (GH) deficiency, GH insensitivity, and neurosecretory dysfunction have been reported in the literature. The optimal GH treatment for NS is still controversial. In this study, we aimed to evaluate the growth characteristics in addition to clinical features of NS, and the growth response to GH treatment by using a nationwide registration system.

## Material and methods:

Children and adolescents with clinical (according to van der Burgt criteria) and/or genetic diagnosis with NS were included to study. Laboratory assessment including standard GH stimulation tests result were evaluated. Height increment of patients with or without GH treatment were analyzed after the therapy.

## Results:

- A total of 99 patients with NS (68 male, 31 female) have been enrolled. On admission, the mean age of patients was 8,37 ± 4,2 years, height SDS was -3,03 ± 1,65, parentally adjusted height deficit was -2,25 ± 1,73, and 30% of them were pubertal (Table 1).
- GH stimulation tests were performed on 63 patients, and 40 of them showed suboptimal GH response (<10 ng/ml). Thirtysix patients received rhGH (mean dose: 0,25 ± 0,05 mg/kg/week). Height SDS increased from -3,69 to -2,85 after two years of therapy. Significant differences was observed according to nonGH-treated patients (n:25) (p:0,02) (Figure 1).
- PTPN11 gene were analyzed 45 of patients, and 29 of them (64%) had mutation. Height SDS at admission were similar in patients with or without PTPN11 gene mutation.

Table 2: Clinical findings of Patients

Characteristics	(%)
Short Stature	77
Cardiac abnormalities	58
Chest Deformities	34
Chriptorchidism in males	59
Neuromotor developmental delay	30
Ophtalmic disorders	23
Hematological findings	7
Renal abnormalities	6
Gastrointestinal findings	17

Table 1: Characteristics of patients

	Male (n:68)	Female (n:31)	TOTAL (n: 99)	P values
Chronological age (year)	8,76	7,55	8,37	0,11
Bone age (year)	7,41	7,68	7,5	0,39
Height SDS	-2,9	-3,31	-3,03	0,13
BMI	16,07	15,45	15,84	0,11
Target Height (cm)	167,29	155,32	163,54	-
THSDS	-0,95	-0,78	-0,9	0,27
Parentally adjusted height deficit	-2,09	-2,63	-2,25	0,06
Gest. weight	2985	2854	2939	0,21
Gest. week	38,9	38,4	38,7	0,12
Pubertal/Prepubertal	17/51 (33%)	6/25 (24%)	23/76 (30%)	-

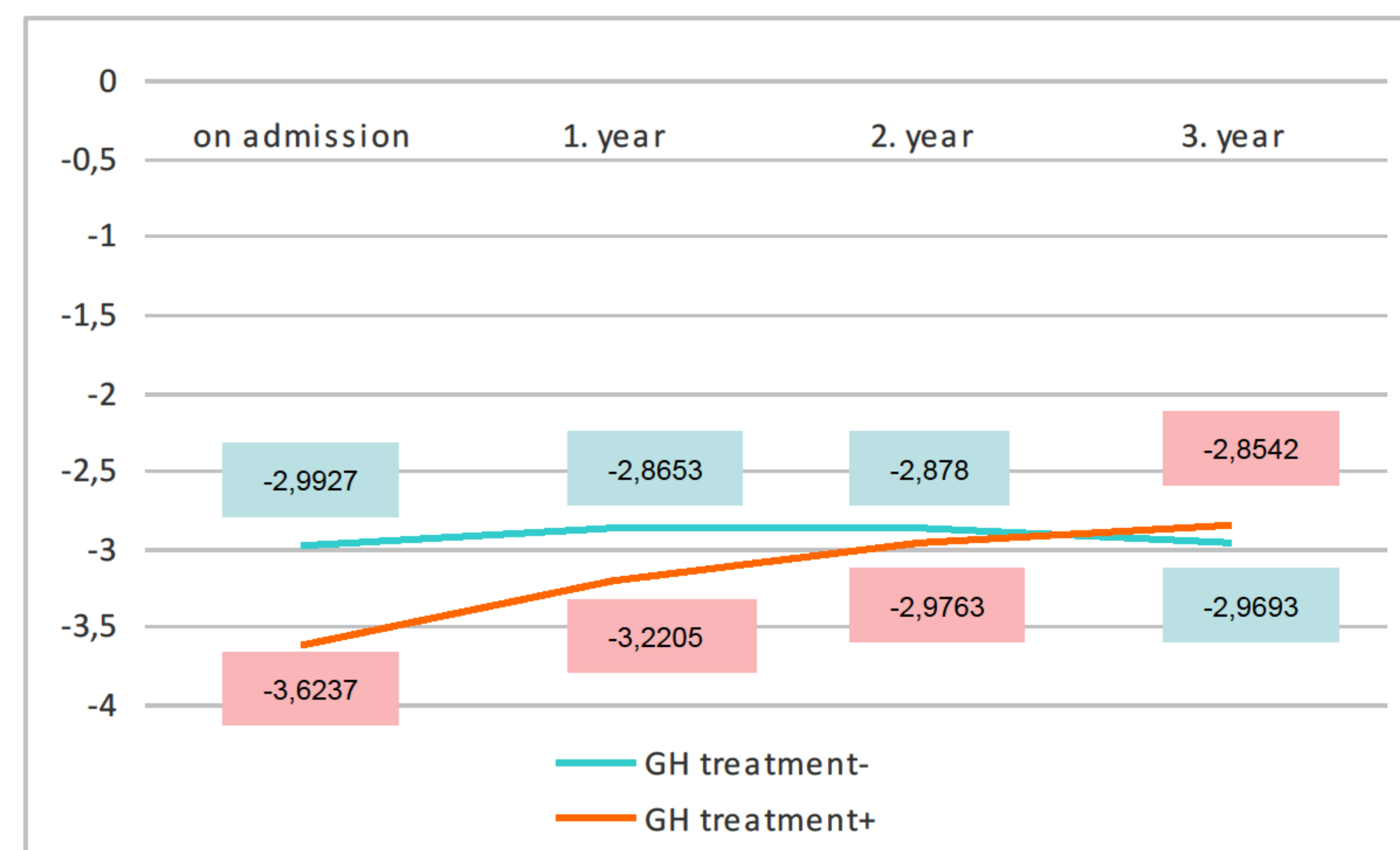


Figure 1: Growth changes of patients with and without GH treatment

**Conclusion:** In the first year GH therapy, increase in  $\Delta$ Height SDS is observed as a positive effect. However this effect of therapy waned at the second year. We suggest that growth therapy optimisation is needed for this NS patients.