Subclinical Hypothyroidism is Associated with Low IGF-I Levels and Decreased Growth Velocity

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FAPESP

Background

- Subclinical hypothyroidism (SH) is defined as normal thyroxine levels in the presence of TSH concentrations between 5 and 10 mU/ml.
- Thyroxine seems to regulate IGF-I levels via modulating GH sensitivity.
- However, the role of GH on IGF-I secretion is not so strong in the early years of life, and
- The impact of SH on IGF system and growth of infants remains unknown.

AIM

To evaluate serum IGF-I, IGFBP-3 concentrations and growth velocity (GV) of infants with SH.

Subjects and Methods

Subjects

- 98 children up to 36 months of age were recalled due to a TSH > 5 mU/ml in the neonatal screening test.
- They were divided in two age-groups:

  Group I (0 – 4 months)

  Group II (4.1 – 36 months).

- These groups were further split into subgroups according to the TSH level observed during follow-up:

  Group IA (*n*=14) and IIA (*n*=49): TSH ≤ 5 mU/ml,

  Group IB (*n*=5) and IIB (*n*=16): 5< TSH ≤ 10 mU/ml

  Group IC (*n*=4) and IIC (*n*=10): TSH > 10 mU/ml.

Design and Assay

GV-SDS was calculated based on the previous 3 months of follow-up.

IGF-I and IGFBP-3 were determined in the same blood sample as TSH (Immulite 2000, Siemens)

Statistical Analysis

Data were compared by t-test, Mann-Whitney and Fisher tests using the GraphPad Prism 6.0 (GraphPad Software Inc., San Diego, CA).

P ≤ 0.05 was assumed as statistically significant

Results

- IGF-I levels were higher in Group IIA than in IIB and IIC (median: 66; 37 and 30 ng/ml, respectively) (*P*=0.005) (Figure 1).
- Similar results were observed for GV-SDS (mean ± SEM) with higher values in IIA (0.74 ± 0.3) than in IIB (−0.78 ± 0.4) and IIC (−0.5 ± 0.5) (*P*=0.03) (Figure 1).

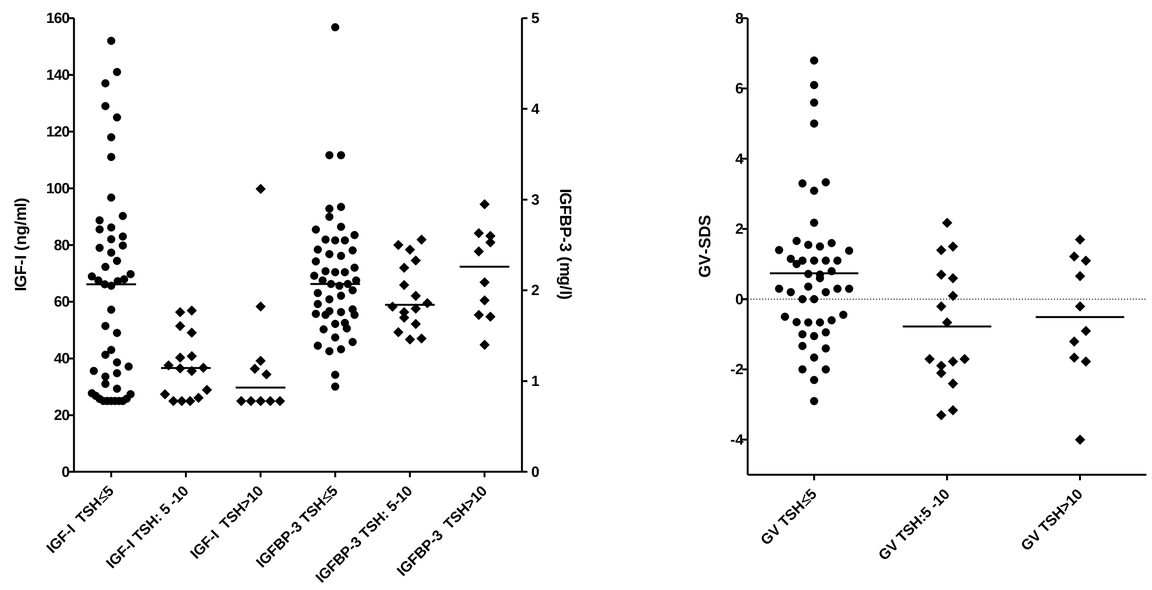

Figure 1: Serum IGF-I and IGFBP-3 levels (Panel A) and GV-SDS (Panel B) in Groups IIA, IIB and IIC. Bars represent median (Panel A) or mean (Panel B).

- These findings were even more significant when Group IIA was compared to IIB+IIC (IGF-I: 66 vs. 36 ng/ml, *P*=0.001) (GV: 0.74 ± 0.3 vs. −0.67±0.3, *P*=0.004).
- No difference was found on IGFBP-3 levels comparing groups IA, IIB and IIC.
- No difference was observed comparing group IA, IB, and IC regarding IGF-I, IGFBP-3 levels or GV, even when group IA was compared to combined IB+IC (Figure 2).

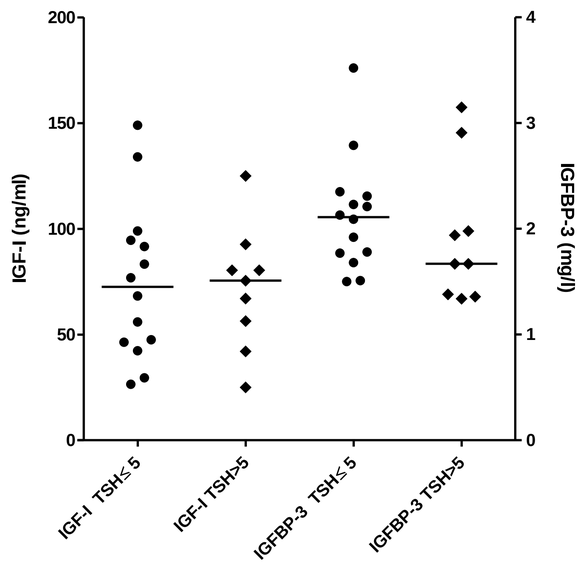

Figure 2: Serum IGF-I and IGFBP-3 levels in Group IA and IB+IC. Bars represent median.

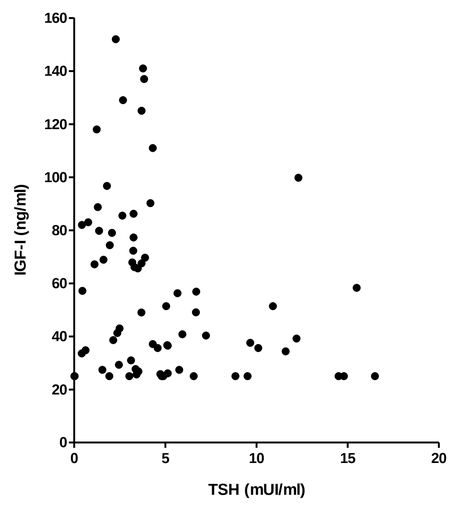

Figure 3: Correlation between serum IGF-I and TSH levels. (*r*=-0.27, *P*=0.02)

Conclusion:

- Reduced serum IGF-I levels and GV were observed in children aged 4–36 months with SH. This was not found earlier in life.
- These findings may reflect a direct action of thyroid hormones on IGF-I secretion rather than a modulation of GH action, as no changes were found on IGFBP-3 levels.
- The real impact on height would demand a longer period of observation.