

# Presentation of IGF-1/IGFBP-3 ratio as an effective monitoring index during treatment of growth hormone deficient patients



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## INTRODUCTION

- ✓ Serum levels of insulin-like growth factor-1 (IGF-1), serum levels of IGF binding protein-3 (IGFBP-3) and the ratio IGF-1/IGFBP-3 (as SDS, as logarithm, as a specific formula) - effective and stable parameters evaluating the safety and efficacy of growth hormone (GH) treatment<sup>1</sup>
- ✓ Still no unified method to compare these parameters
- ✓ All parameters are not easy to calculate and hence, not routinely used in daily practice

## AIM

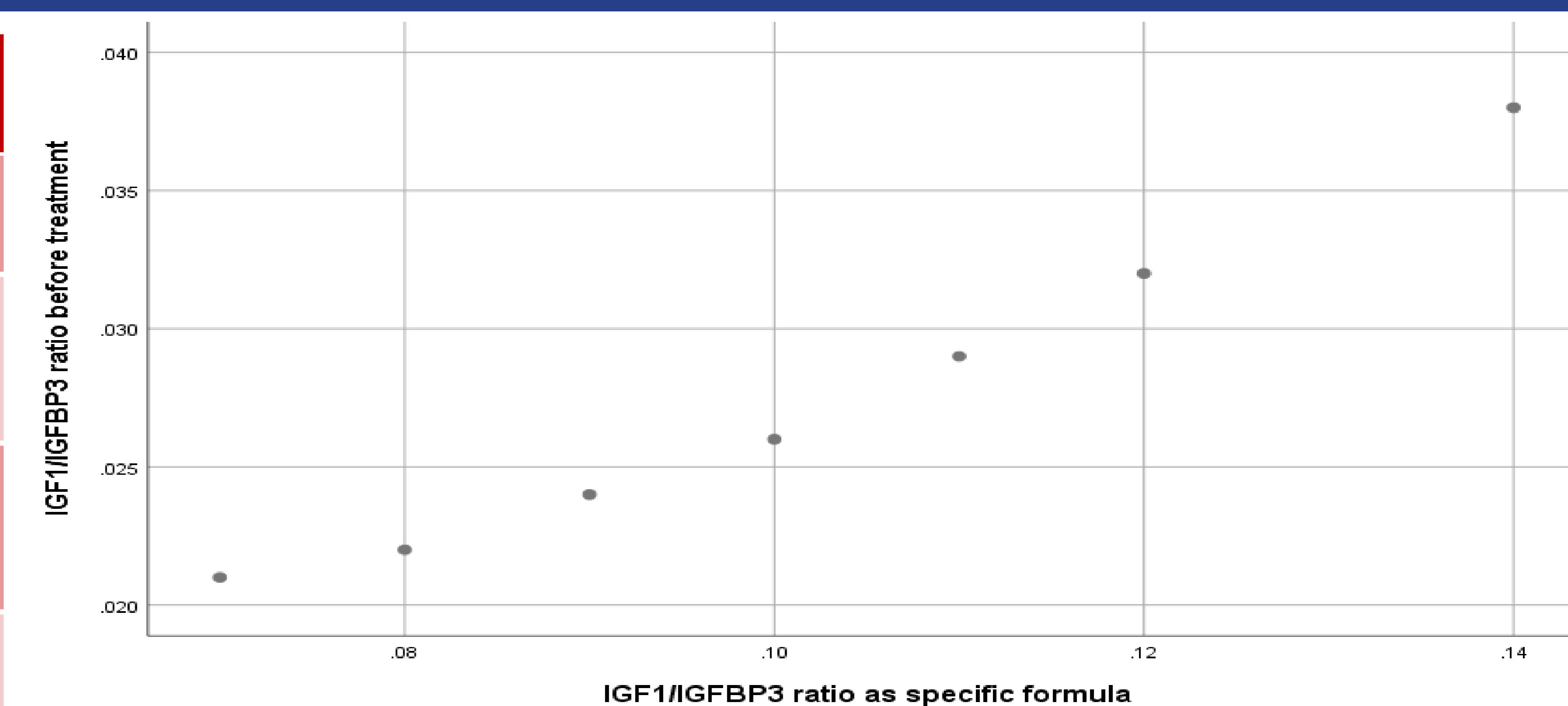
The aim of this study is to compare the direct ratio of the serum levels of IGF-1 and IGFBP-3 with established models in order to propose a new reliable and easy to use in the everyday practice tool for supporting the assessment of the GH therapy efficacy and safety in GH deficient (GHD) patients.

## METHOD

- **72 GHD patients** (73.6% boys, age range 1-18 years), on **GH therapy**
- Collected serum levels of **IGF-1 (ng/ml)** and **IGFBP-3 (ng/ml)**
- **IGF-1 to IGFBP-3 - calculated as a simple ratio** (without any prior adjustments)
- Blood samples (n=104) were analyzed at different points of the patients' observation (2019-2020):
  - before starting of therapy (n=7)
  - during the 1<sup>st</sup> year of treatment (n=26)
  - during the 2<sup>nd</sup> year of treatment (n=15)
  - after 2 years of treatment (n=56)

## RESULTS

	Before treatment	1 <sup>st</sup> year	2 <sup>nd</sup> year	After 2 years of treatment
<b>n (blood samples)</b>	7	26	15	56
<b>IGF-1 (ng/ml)</b>	118.8 ± 75.8	263.9 ± 86.2	233.8 ± 125.1	245.5 ± 102.8
<b>IGFBP-3 (ng/ml)</b>	4100 ± 1776	5850 ± 2130	5010 ± 1400	5300 ± 1150
<b>IGF-1/IGFBP-3 ratio</b>	0.027 ± 0.009 (median 0.026)	0.042 ± 0.023 (median 0.036)	0.045 ± 0.016 (median 0.043)	0.044 ± 0.023 (median 0.043)
<b>Correlation of IGF-1/IGFBP-3 ratio with SDS<sub>IGF-1/IGFBP-3</sub><sup>2</sup></b>	r=0.69 p=0.05	r=0.72 p=0.05	r=0.75 p=0.05	r=0.73 p<0.05
<b>Correlation of IGF-1/IGFBP-3 ratio with IGF-1/IGFBP-3 ratio as specific formula<sup>3</sup></b>	r=0.72 p<0.05	r=0.83 p<0.05	r=0.89 p<0.05	r=0.89 p<0.05



**Figure 1.** Correlation between IGF-1/IGFBP-3 simple ratio and IGF-1/IGFBP-3 molar ratio, calculated with specific formula<sup>3</sup> before treatment with GH, r=0.72, p<0.05

- ✓ Levels of IGF-1, IGFBP-3 and IGF-1/IGFBP-3 ratio before the GH treatment correlate highly and significantly with the values in SDS<sup>2</sup> and especially with the specific formula for calculating molar ratio<sup>3</sup>
- ✓ After the initiation of the GH therapy, there is an increase in the levels of IGF-1, IGFBP-3 and the IGF-1/IGFBP-3 ratio
- ✓ The IGF-1/IGFBP-3 ratio increases until the 2<sup>nd</sup> year of treatment and stays stable thereafter
- ✓ The ratio did not correlate with age, sex or pubertal status of the patients, just with the year since the start of the GH therapy

## CONCLUSIONS

The results of this study show that the proposed simple calculation of IGF-1/IGFBP-3 ratio could be used as easily accessible index during GH treatment.

Its relation with other parameters of efficacy and safety as well as its behavior in other GH treated conditions remains to be further elucidated.

## REFERENCES

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