

The correlation between the increase in insulin-like growth factor-I 24 hours after the first injection of growth hormone and the improved growth

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Introduction

Insulin-like growth factor-I (IGF-I) is a biomarker of growth hormone (GH), and is often used to titrate the dose of GH therapy. However, IGF-I production is regulated by not only GH but also other factors. We investigated whether the increase in IGF-I at several time points after the commencement of GH therapy could be a predictive factor for the improved growth.

Subjects and Methods

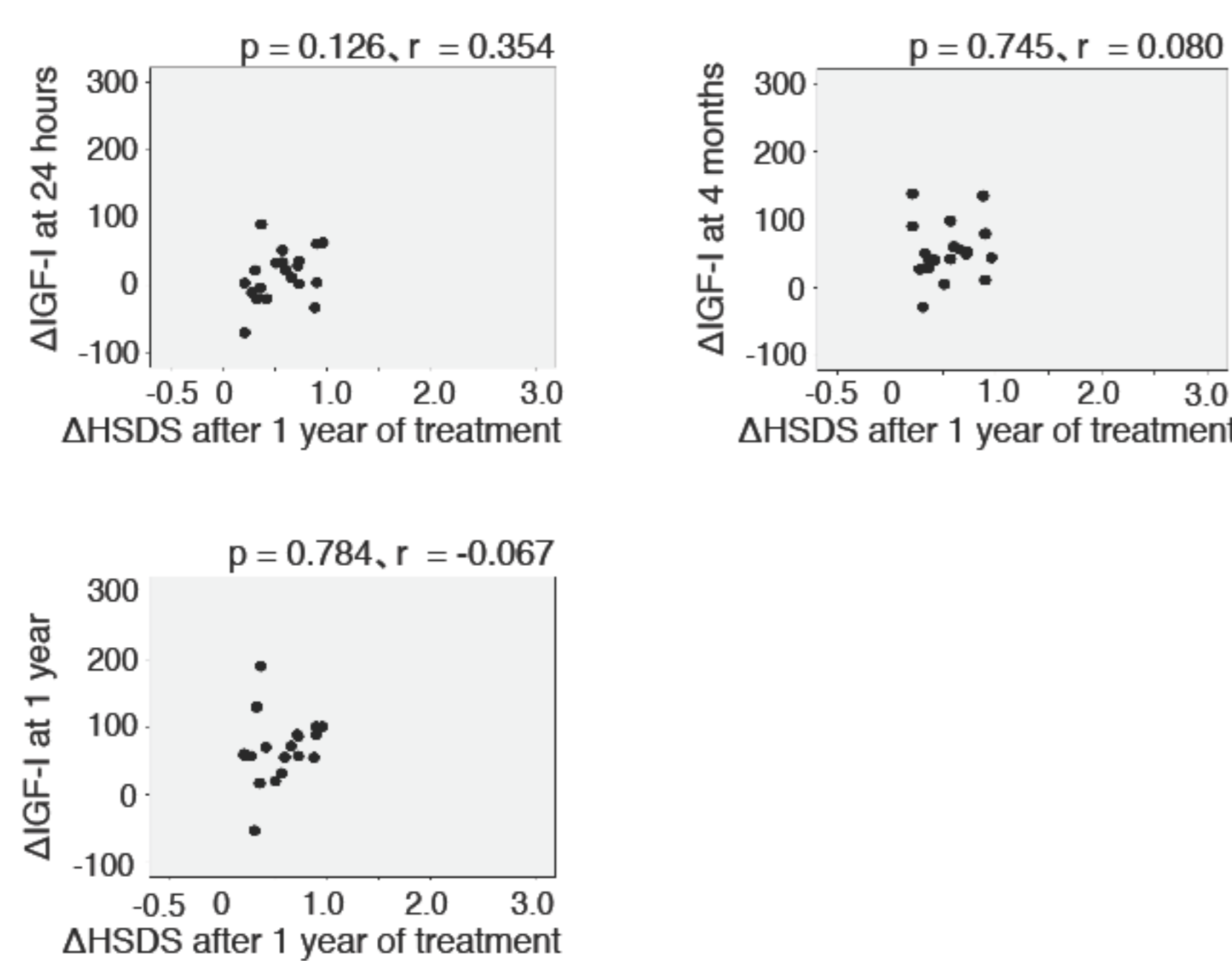
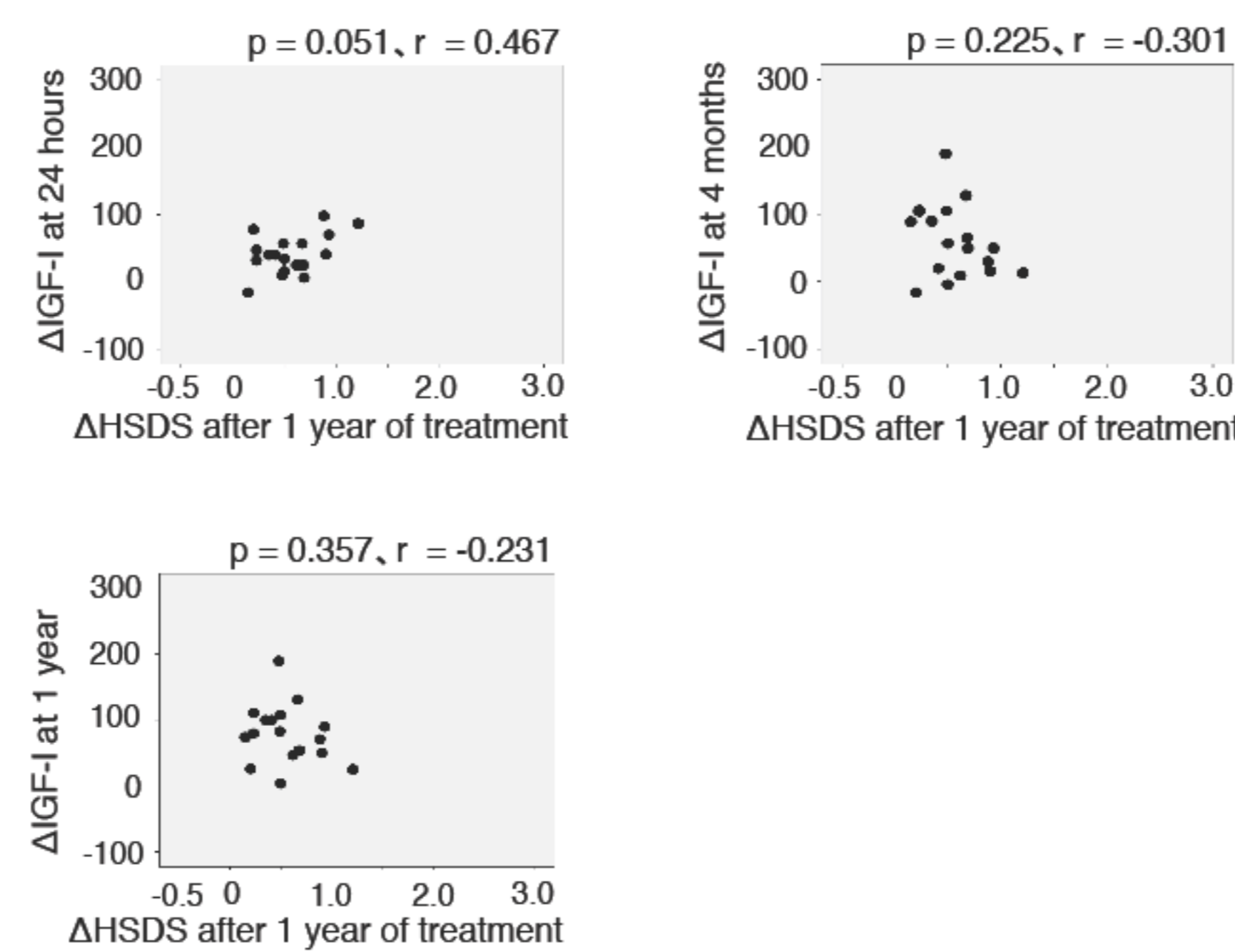
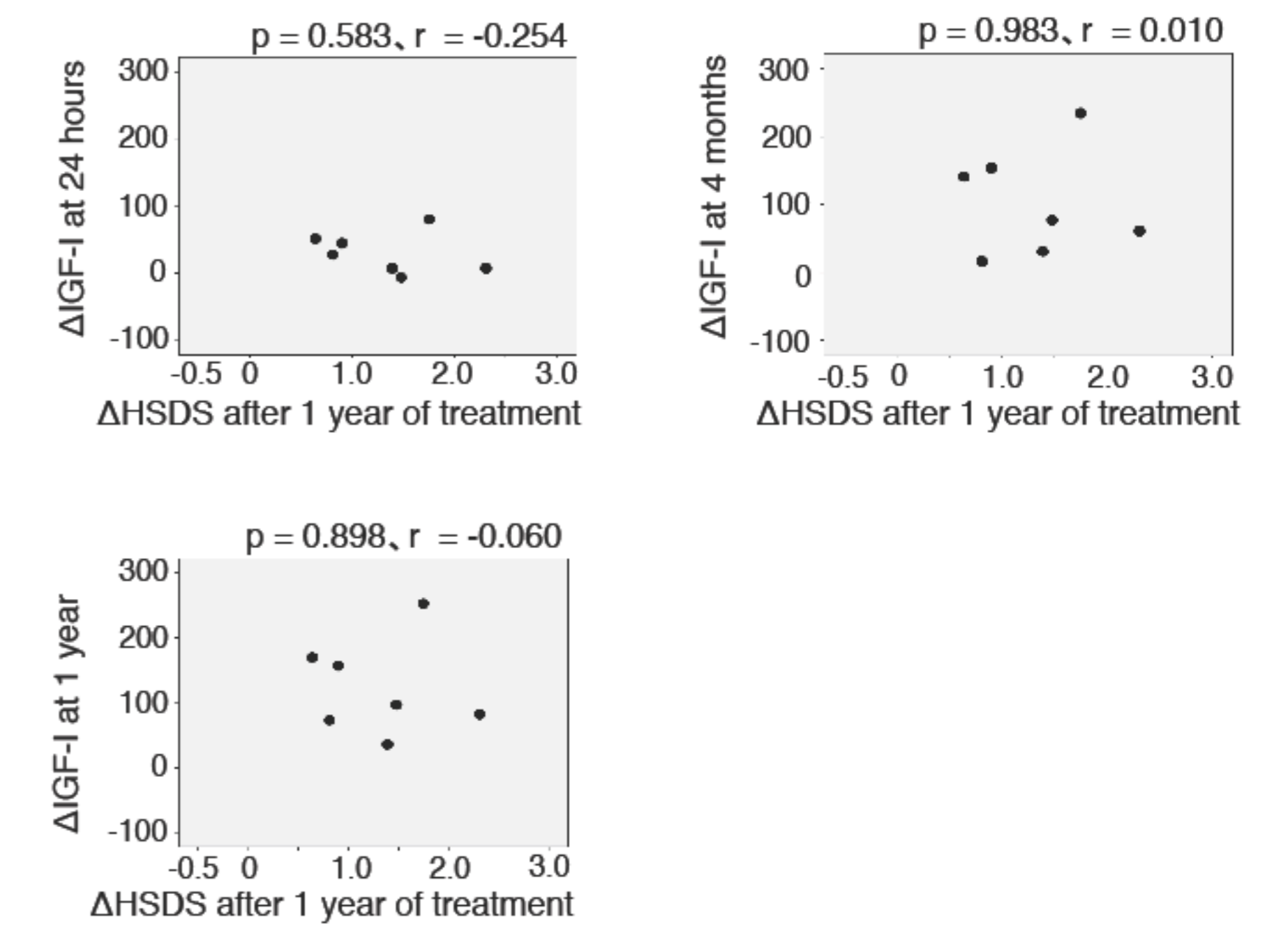
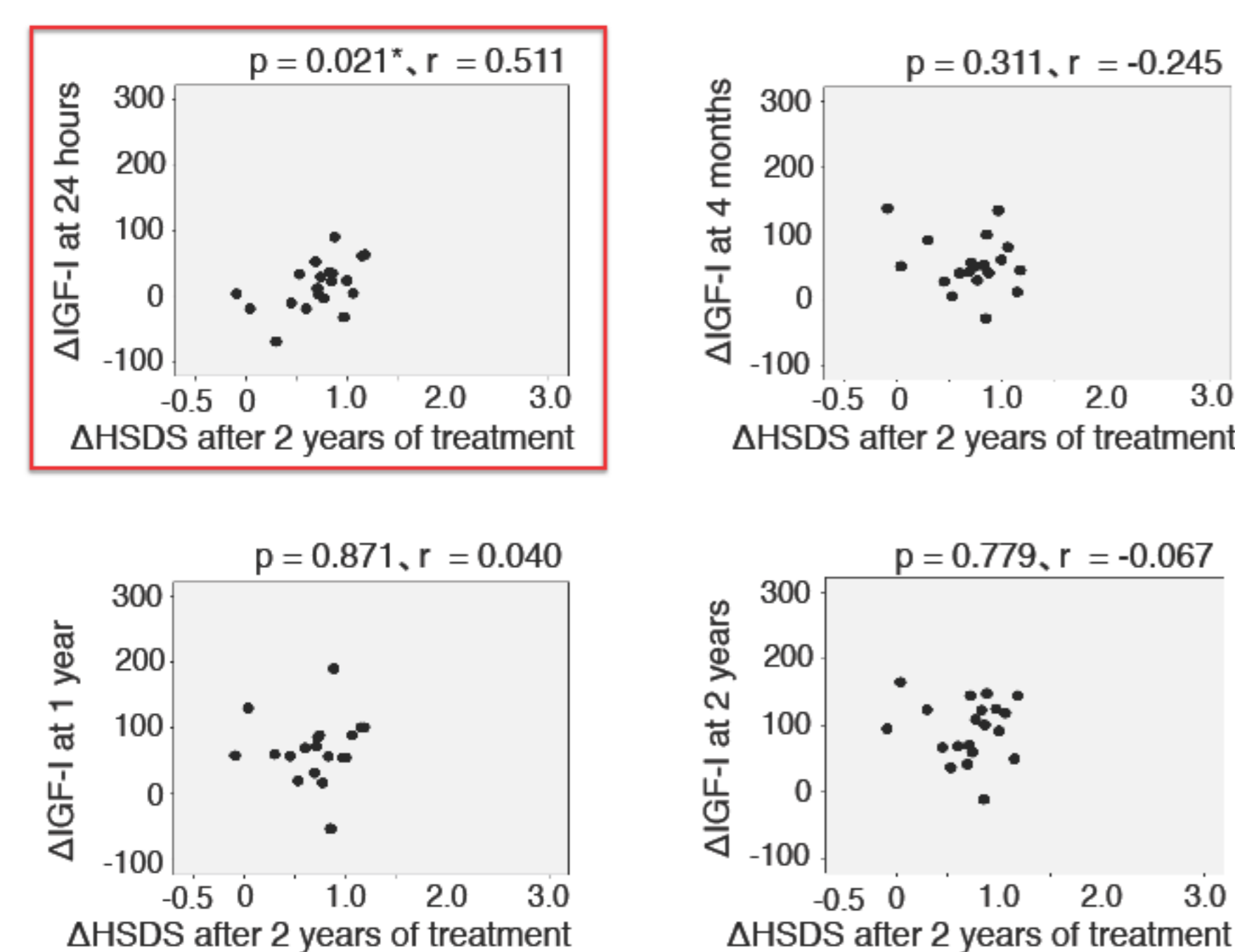
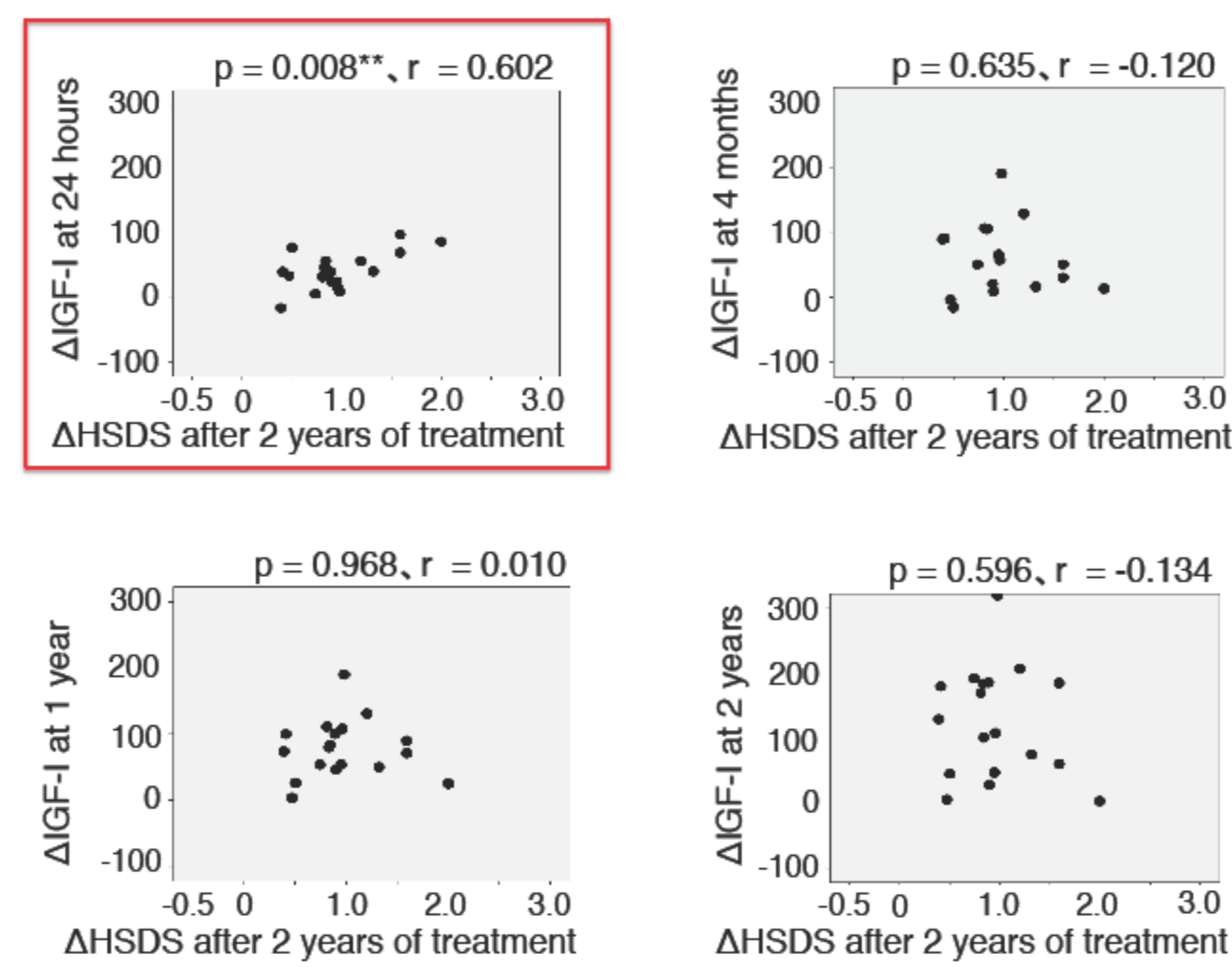
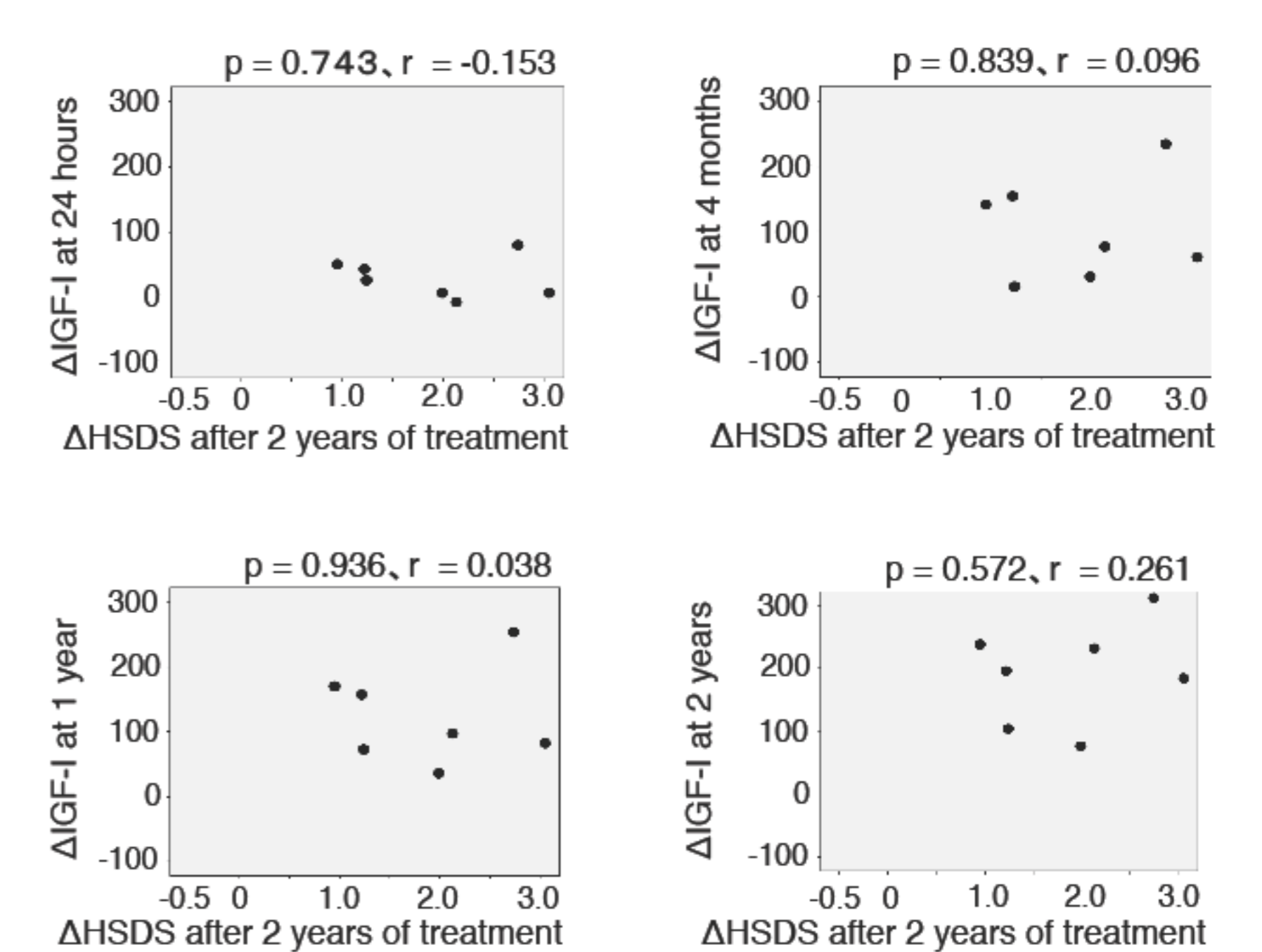
We studied 45 pre-pubertal patients with growth hormone deficiency (GHD) that had continued with GH treatment for more than 2 years (29 boys and 16 girls). GHD was mild in 20 patients, moderate in 18, and severe in seven.

We statistically analyzed the correlation between the following values:

- 1) The increase in IGF-I (Δ IGF-I) at 24 hours, 4 months, 1 year, or 2 years after GH therapy was started.
- 2) The increase in height SD score (Δ HSDS) at 1 year or 2 years.

Table 1. Patients characteristics (n=45)

GHD	Mild (n=20)	Moderate (n=18)	Severe (n=7)
Age at the commencement of GH therapy	7.4 \pm 1.5 (5.5~11.3)	7.3 \pm 1.3 (5.5~9.8)	5.8 \pm 2.0 (3.1~8.1)
HSDS at the commencement of GH therapy	-2.9 \pm 0.6 (-4.2~-2.1)	-3.3 \pm 1.3 (-7.7~-2.4)	-3.2 \pm 0.9 (-4.3~-2.2)

Fig 1A. Mild GHD (Δ HSDS after 1 year of treatment)Fig 1B. Moderate GHD (Δ HSDS after 1 year of treatment)Fig 1C. Severe GHD (Δ HSDS after 1 year of treatment)Fig 2A. Mild GHD (Δ HSDS after 2 years of treatment)Fig 2B. Moderate GHD (Δ HSDS after 2 years of treatment)Fig 2C. Severe GHD (Δ HSDS after 2 years of treatment)

Results

The Δ IGF-I 24 hours after GH therapy was started was significantly correlated with Δ HSDS at 2 years in mild and moderate GHD patients (Figs 2A and 2B: $p=0.021$, $r=0.511$ and $p=0.008$, $r=0.602$, respectively). The Δ IGF-I at 4 months, 1 year, or 2 years in the mild and moderate GHD patients and at any time points in the severe GHD patients was not correlated with Δ HSDS at 2 years. When we analyzed both mild and moderate GHD patients together, the 24 hours Δ IGF-I was significantly correlated with Δ HSDS at 1 year as well ($p=0.016$, $r=0.389$, data not shown).

Discussion

This study clarified that the Δ IGF-I 24 hours after the initiation of GH therapy was significantly correlated with the improved growth of GHD patients. Since IGF-I is affected by various factors, i.e. nutrition and pubertal stage, its value immediately after the initiation of GH therapy is important to reflect the efficacy of GH.

Conclusion

IGF-I 24 hours after the first injection of GH is an early and useful predictive factor for the efficacy of GH in GHD patients.

References

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