

# Relation between CNP signaling pathway and the effect of combined treatment with GnRHa and GH on the linear growth in mid/late pubertal girls at great bone ages with CPP or EFP

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## OBJECTIVES

- To evaluate the effect of combined treatment with Gonadotropin-releasing hormone analogue (GnRHa) and recombinant human growth hormone (GH) on the linear growth in mid/late pubertal girls at great bone ages with central precocious puberty (CPP) or early and fast puberty (EFP).
- To investigate the relation between C-type natriuretic peptide (CNP) signaling pathway and GH's effect on linear growth in these girls.

## METHODS

Twenty-two girls were diagnosed as CPP or EFP, whose bone ages were older than 11.5 yrs, and received different therapies as follows: eleven girls received the combined treatment with GH and GnRHa, another eleven girls matched for auxological characteristics were treated with GnRHa alone. At the beginning and the end of the 6 months' treatment, peripheral blood samples were collected to test serum amino-terminal proC-type natriuretic peptide (NTproCNP), insulin-like growth factor-1 (IGF-1) and procollagen type 1 amino-terminal propeptide (P1NP) concentrations. Comparisons were made among height velocity (HV), the improvement of predicted adult height (PAH) and the changes of serum NTproCNP, IGF-1, P1NP concentrations between the two groups.

## RESULTS

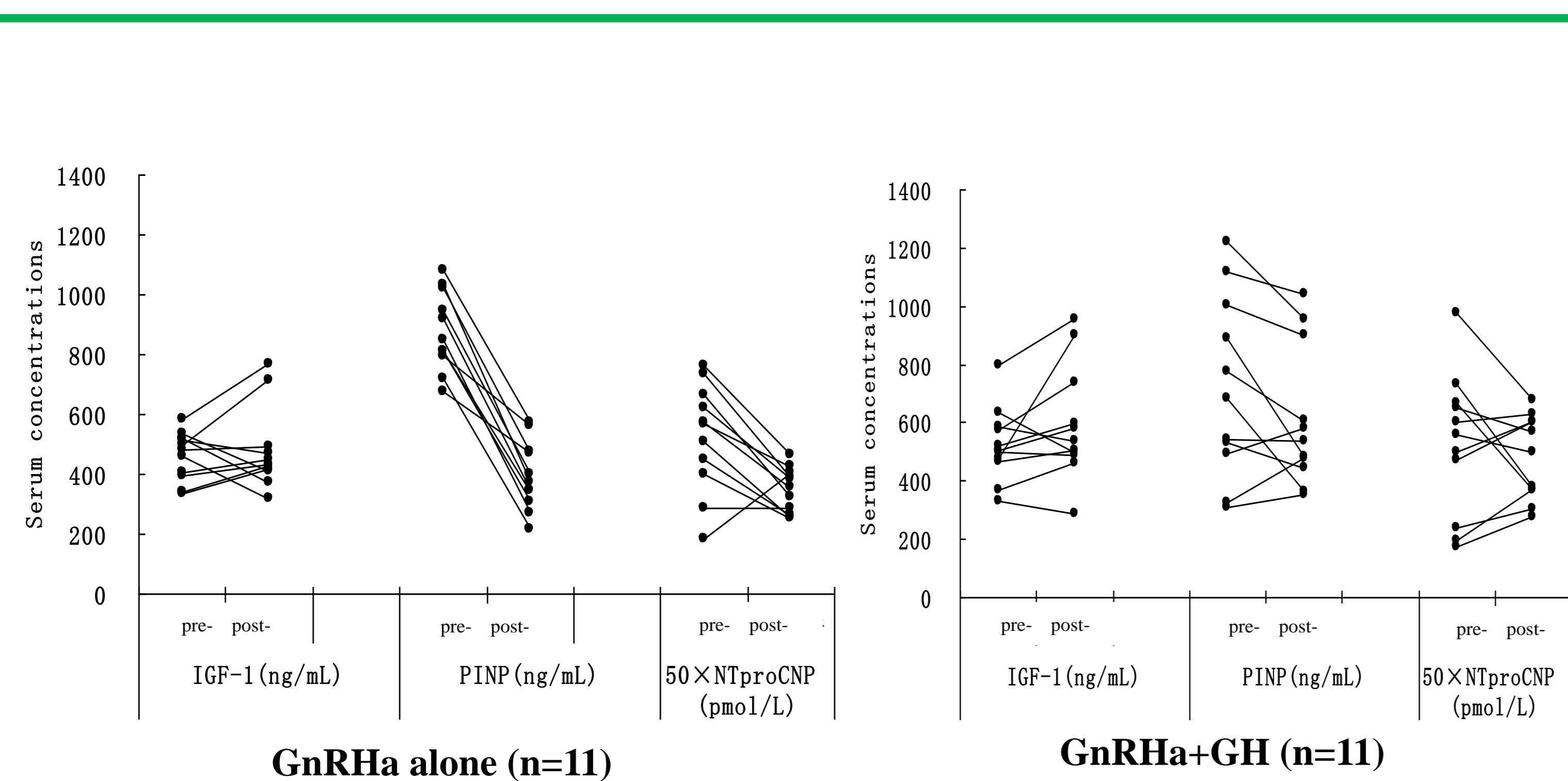


Fig.1 Serum IGF-1, P1NP & NTproCNP concentrations before and after 6-month's treatment with GnRHa alone or combined with GH in CPP or EFP girls

After six months' treatment, the height velocity and  $\Delta$ PAH of the girls treated with GH and GnRHa were statistically faster and higher compared with control group ( $P < 0.01$ ). Serum NTproCNP [ $(10.5 \pm 4.9)$  pmol/L vs.  $(9.6 \pm 2.9)$  pmol/L], IGF-1 and P1NP concentrations were not significantly different between the beginning and the end of the 6 months' treatment in the GH-combined group ( $P > 0.05$ ). In contrast, the girls treated with GnRHa alone showed a significantly decrease of both serum NTproCNP [ $(10.5 \pm 3.6)$  pmol/L vs.  $(6.9 \pm 1.5)$  pmol/L] and P1NP levels ( $P < 0.05$ ), but no significant change of serum IGF-1 level (Fig.1).

## CONCLUSIONS

- In CPP or EFP girls who are in mid/late puberty and at great bone ages, the combined treatment with GH and GnRHa may accelerate linear growth and improve predicted adult height.
- This growth-accelerating effect of GH could in part be induced by the increase production of CNP.

## References

Prickett TC, Bothwell JC, Yandle TG, et al. Pharmacodynamic responses of plasma and tissue C-type natriuretic peptide to GH: correlation with linear growth in GH-deficient rats. *J Endocrinol*, 2012,212:217-225.