

Evaluation of β -cell function in young MODY patients using a Mixed Meal Tolerance Test

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Background

Mixed meal tolerance test (MMTT) is a gold standard for evaluating β -cell function. There is limited data on MMTT and β -cell function in MODY patients.

Objective

The aim was to analyze plasma C-peptide (CP) levels during MMTT in MODY patients as a biomarker of β -cell function.

Methods

The cohort consisted of 39 patients with MODY genes mutations:

- 20 - *GCK*
- 8 - *HNF1A*
- 3 - *HNF4A*
- 4 - *KCNJ11*
- 2 - *ABCC8*
- 1 - *INS*
- 1 - *KLF11*

59% were children (n=23), and 41% - adults (18-27 years, n=16).

MMTT was performed following standardized technique: overnight fast \rightarrow ingestion of 6 mL/kg (max 360 mL) of standard liquid meal (1 kcal/mL).

Blood samples for CP and glycemia levels were taken 10 min prior to the meal (t_{-10}), at the meal time (t_0), and time points: t_{15} , t_{30} , t_{60} , t_{90} , t_{120} , t_{150} , t_{180} . The results of CP were available at each time point for all subjects.

AUC_{CP} , CP_{Base} , CP_{max} concentrations were evaluated for all subjects and compared between MODY groups.

The cutoff of stimulated $CP < 0.2$ nmol/L was used in our study and described by other authors as a predictor of poor β -cell response and absolute insulin deficiency.

Kruskal-Wallis test used to compare data in Fig. 1.

Results

The median of participants' age was 190 months [142;269].

The median of diabetes duration was 44 months [25;136].

The youngest patient with performed MMTT was 2.5 years old (*KCNJ11*).

Conclusions

As expected *GCK* diabetes patients preserved the best β -cell function. For other than *GCK* related monogenic diabetes, a pretreatment challenge with MMTT might be a useful indicator to predict therapeutic success with oral sulfonylurea treatment after genetic diagnosis.

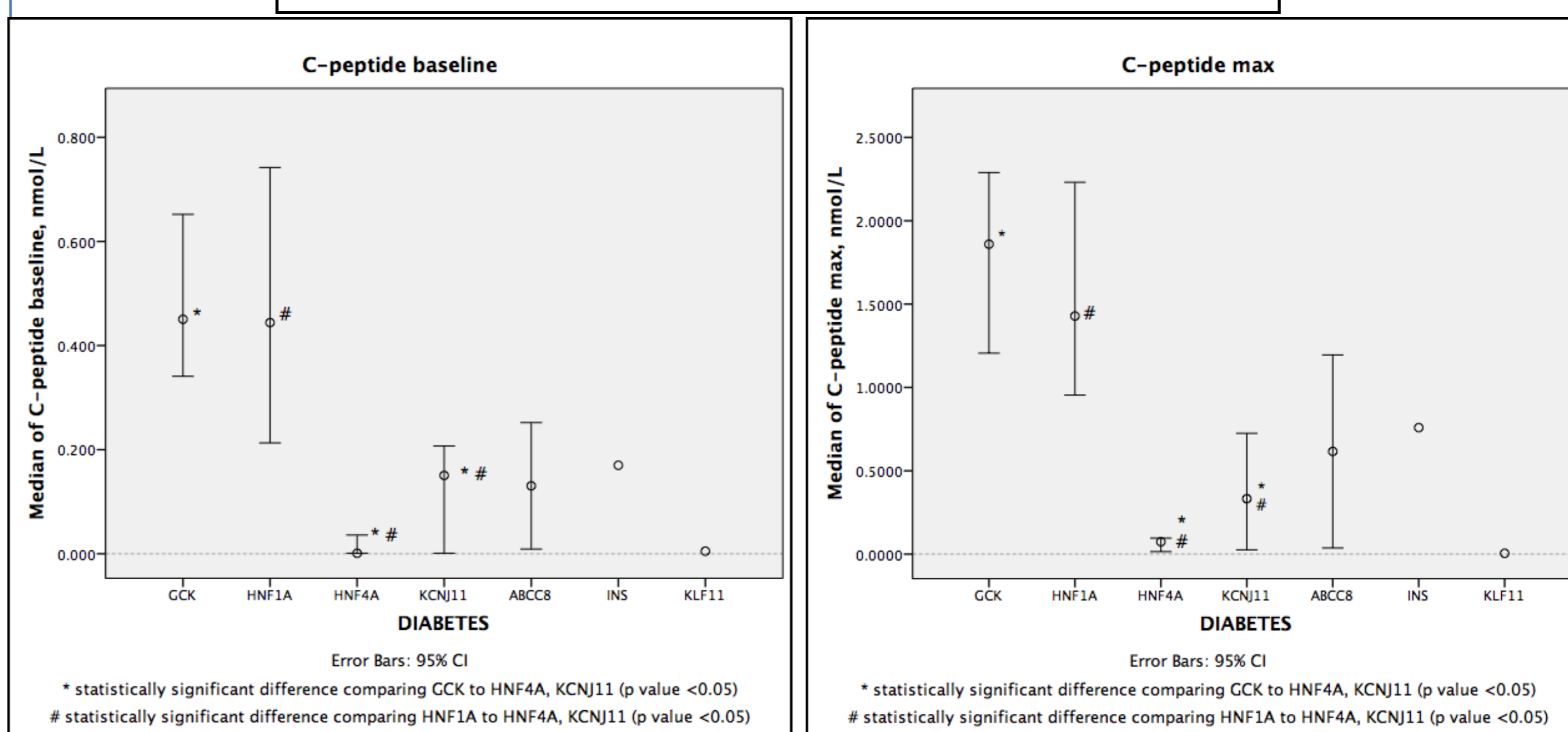
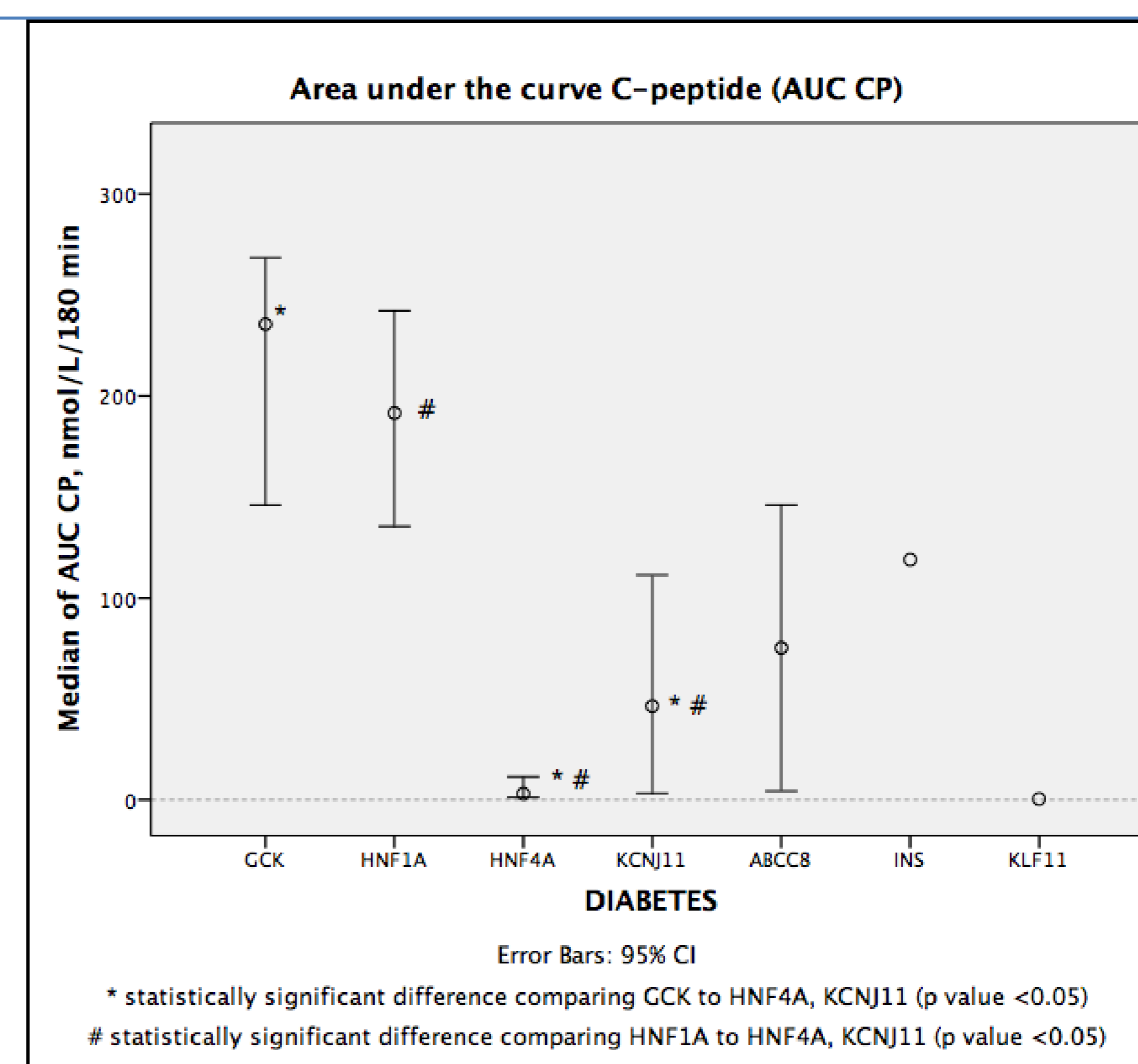
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Fig. 1



3 *HNF4A*, 1 *KCNJ11*, 1 *ABCC8* patients had all CP levels < 0.2 nmol/L. All these patients had an unsuccessful treatment change trial and they are all treated with insulin.

6 *HNF1A* and 3 *KCNJ11* patients had a successful treatment change to oral sulfonylurea agents.

Fig.2

