Height in Infants aged 1 year with classic Congenital Adrenal Hyperplasia is related to their Urinary Steroid Hormone Metabolite Profile

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Background

Controlling therapy of infants, especially from neonates onwards, with classic congenital adrenal hyperplasia (CAH) is challenging due to the lack of reference values.

Objective and hypotheses

Retrospective analysis of the urinary steroid metabolome obtained by gas chromatography-mass spectrometry (GC-MS) for treatment monitoring of infants with CAH.

Methods

We retrospectively analyzed repeated spot urinary steroid hormone metabolite profiles determined by gas chromatography–mass spectrometry (GC-MS) of 60 infants aged ≤ 4 years with classic 21-hydroxylase deficiency (21-OHD) on hydrocortisone and fludrocortisone treatment. **Fig. 1** gives an overview of analyzed urinary steroid metabolites.

Results

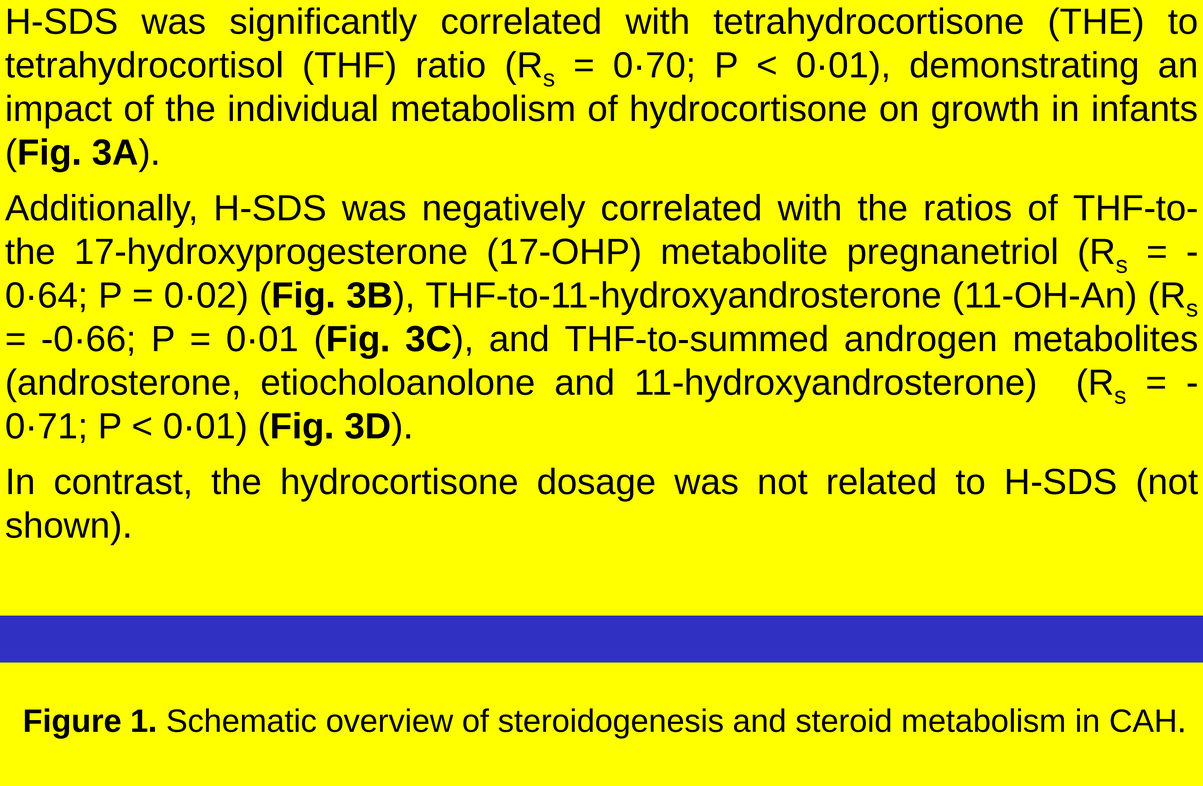
Infants aged 1 year (N=14) demonstrated a reduction of their height (H-SDS: -1.0 ± 1.7) (**Fig. 2**).

H-SDS was significantly correlated with tetrahydrocortisone (THE) to tetrahydrocortisol (THF) ratio (R_s = 0·70; P < 0·01), demonstrating an impact of the individual metabolism of hydrocortisone on growth in infants (**Fig. 3A**).

Additionally, H-SDS was negatively correlated with the ratios of THF-to-the 17-hydroxyprogesterone (17-OHP) metabolite pregnanetriol (R_s = -0·64; P = 0·02) (**Fig. 3B**), THF-to-11-hydroxyandrosterone (11-OH-An) (R_s = -0·66; P = 0·01 (**Fig. 3C**), and THF-to-summed androgen metabolites (androsterone, etiocholoanolone and 11-hydroxyandrosterone) (R_s = -0·71; P < 0·01) (**Fig. 3D**).

In contrast, the hydrocortisone dosage was not related to H-SDS (not shown).

Figure 1. Schematic overview of steroidogenesis and steroid metabolism in CAH.



Conclusions

A substantial proportion of infants with CAH were over treated. The urinary steroid hormone metabolite profiles, but not the prescribed hydrocortisone dosage, were related to height at one year in infants with classic CAH. Additionally, the individual metabolism of hydrocortisone, as shown by the tetrahydrocortisone-to-tetrahydrocortisol ratio, influences the growth in infants treated with hydrocortisone.

Figure 2. Height-SDS values of the different age groups.

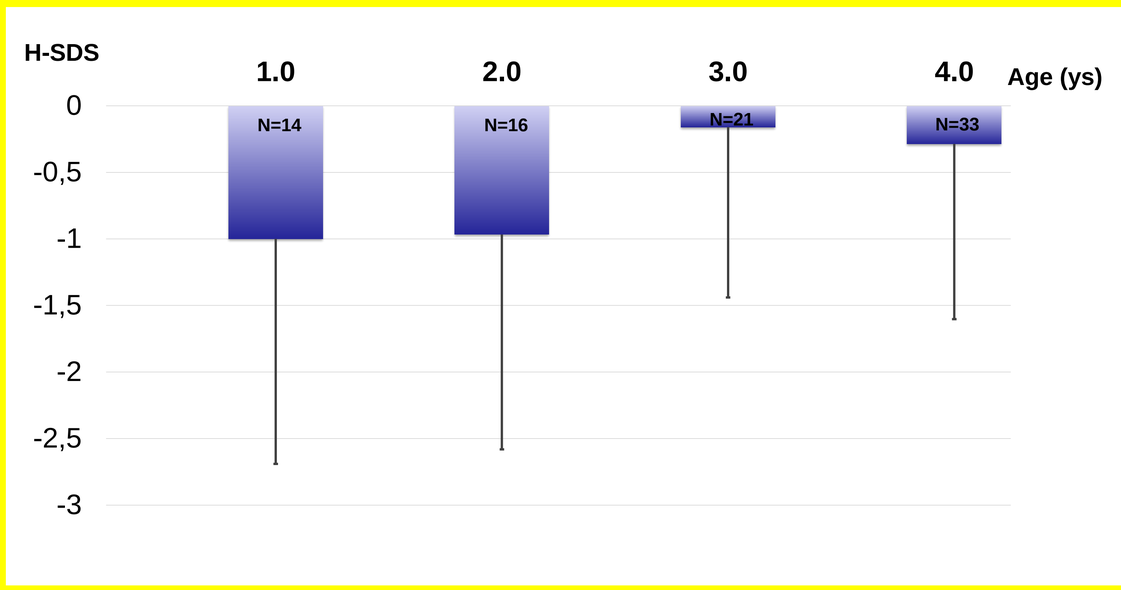
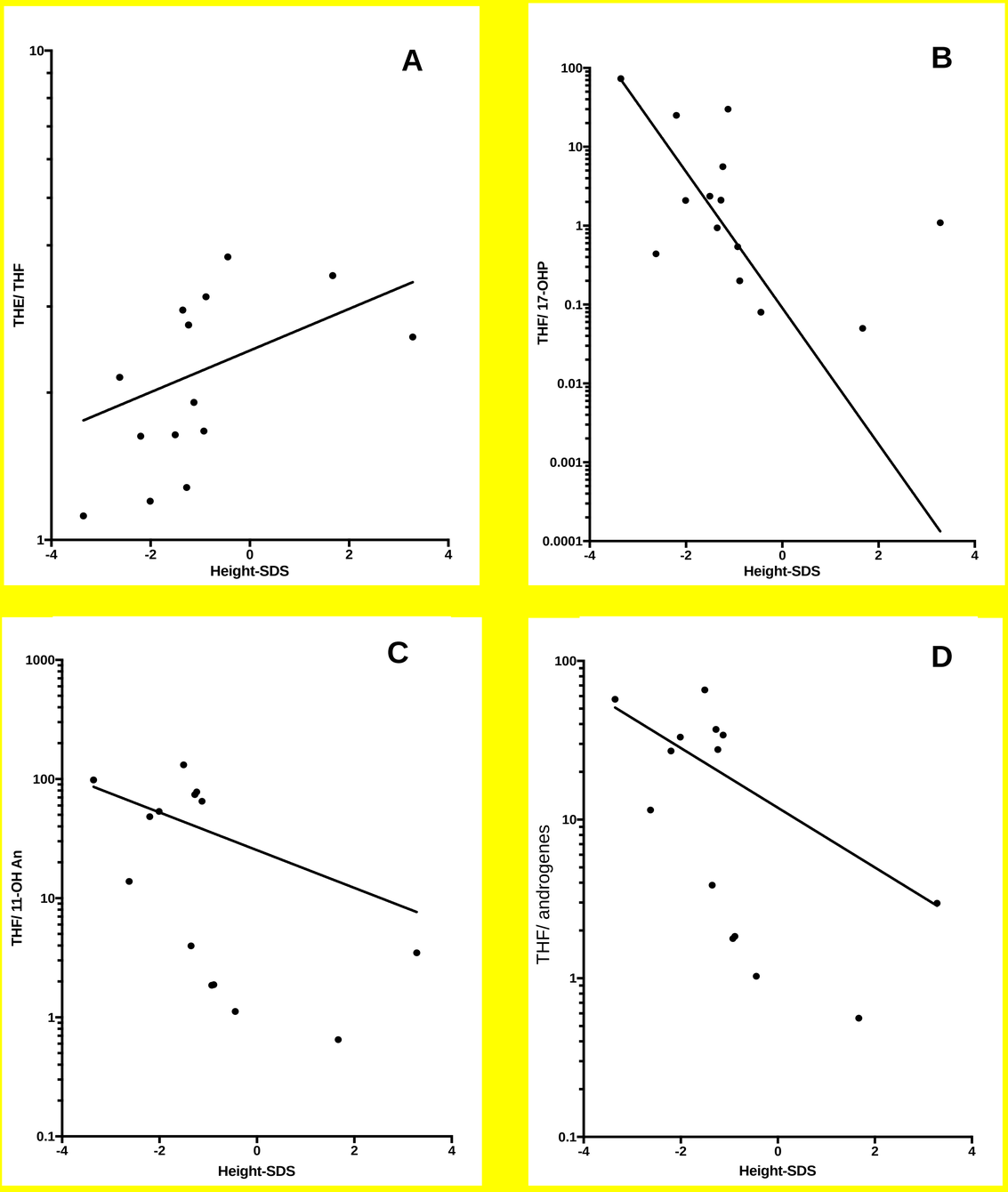


Figure 3. Correlation between metabolite ratios and H-SDS at 1 year of age.



Disclosure: The authors have nothing to disclose.