Serum sex hormone binding globulin levels, but not a 4-hour profile of 17-OH progesterone, would be useful in monitoring children with congenital adrenal hyperplasia

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INTRODUCTION
There exists no gold standard for adjustment of treatment in congenital adrenal hyperplasia (CAH). Clinicians try to avoid over- and undertreatment by considering various indicators. Different strategies including a 24-hour monitoring profile have been suggested to determine the metabolic control (1,2).

AIM
We aimed to investigate the optimal sampling time for 17-OHP and the use of sex hormone binding globulin (SHBG) as a monitoring parameter in salt-wasting CAH due to 21-hydroxylase deficiency.

METHOD
Cross-sectional study, 16 children (9 girls, 7 boys; median age 7 years) with salt-wasting CAH.

First, androstenedione, 17-OHP, cortisol, SHBG, electrolytes, insulin, TSH, free T4 were obtained between 07:00 and 08:00 a.m., prior to morning dose of hydrocortisone and fludrocortisone.

Samples of 17-OHP and cortisol were additionally collected 1, 2, and 4 hours after the morning dose and assayed using high performance liquid chromatography.

Subjects were divided into good and poor control groups defined according to hyperandrogenic state, considered when (i) bone age SD score ≥2, (ii) annual change in height SD score was ≥0.3, (iii) androstenedione ≥3.3 ng/mL for girls and >3.1 ng/mL for boys, or (iv) 17-OHP ≥10 ng/mL. The results are reported as median (interquartile range).

RESULTS
Premedication 17-OHP levels were strongly correlated with 17-OHP levels 1, 2, and 4 hours after the morning dose (r=0.929, p<0.01; rs=0.943, p<0.01; rs=0.835, p<0.01, respectively). Clinical features, indicators of hyperandrogenic state, and the ratio of reduction of 17-OHP levels after medication were similar in children with premedication serum 17-OHP levels ≥10 ng/mL (n=9) vs. <10 ng/mL (n=7) while hydrocortisone doses were significantly lower in children with high 17-OHP levels [11 (6) vs 19 (11) mg/m2/day, p=0.017]. Clinical and biochemical features were not different except significantly higher SHBG values [92 (56) mmol/L vs 49 (22), p=0.036] in the growth acceleration group (n=8) and significantly lower daily hydrocortisone doses in children with growth acceleration [7 (7) vs 15 (9) mg/m2/day, p=0.036] and in those with elevated androstenedione levels [9 (6) vs 19 (9) mg/m2/day, p=0.039].

CONCLUSIONS
When over- or undertreatment is suspected, the levels of 17-OHP should not be trusted, it misses the hyperandrogenic state or may falsely suggest unnecessary dose increments.

A 4-hour profile of 17-OHP does not add significant data over early morning premedication 17-OHP levels.

In general, low doses of hydrocortisone should be avoided. SHBG can be considered as an indicator of hyperandrogenemia.

REFERENCES

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