Cardiac function in pediatric patients with congenital adrenal hyperplasia

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Conclusion

Cardiac evaluation of pediatric CAH patients showed no signs of left ventricular hypertrophy, ventricular dilatation and myocardial deformation abnormalities

We found a thinner LVPWd in CAH patients, this finding was not associated with treatment or hyperandrogenism

A shorter isovolumetric relaxation time in CAH patients suggested increased left atrial pressure

Introduction

Congenital adrenal hyperplasia (CAH) is a disorder of adrenal steroidogenesis

Patients with CAH are at risk of developing an unfavorable cardiovascular risk (CVR) profile

Androgen excess and treatment with supraphysiological doses of glucocorticoids may cause unfavorable changes in the CVR profile

Data on the cardiac function in CAH patients is scarce

Objective
To evaluate the cardiac function in pediatric CAH patients

Patients and methods

Cross sectional study in patients with genetically proven CAH, aged 8-16 years (n=27)

Age and gender matched healthy controls (n=27)

Physical examination and electrocardiogram (ECG) in all CAH patients

Evaluation of the cardiac function by conventional echocardiography and 2D speckle tracking derived strain (myocardial deformation)

Data on hydrocortisone dosage of all CAH patients was collected and blood was withdrawn in all CAH patients to evaluate 17-OH-progesterone and androstenedione concentrations

Patient characteristics

	CAH patients (mean ± SD)	Controls (mean ± SD)	P-value
Gender (M/F)	17 M / 10 F	17 M / 10 F	
Age (years)	12.15 ± 2.29	12.25 ± 2.45	0.536
BMI SDS	0.67 ± 1.29	0.04 ± 1.00	0.054

Results

Cardiac function evaluated by conventional echocardiography

Echocardiographic parameter	CAH patients (mean ± SD)	Controls (mean ± SD)	P-value
FS (%)	37 ± 4	36 ± 4 (n=24)	0.638
EF (%)	66 ± 6	67 ± 5	0.701
LVIDd (mm)	46.4 ± 4.5	45.2 ± 4.9	0.226
LVIDd (Z)	0.95 ± 0.98	0.63 ± 0.75	0.197
LVIDs (mm)	29.3 ± 3.8	28.5 ± 3.9	0.323
LVIDs (Z)	0.57 ± 0.97	0.31 ± 0.95	0.330
IVSd (mm)	5.50 ± 0.87	5.70 ± 1.17	0.359
IVSd (Z)	-1.42 ± 0.76	-1.15 ± 1.01	0.200
LVPWd (mm)	5.55 ± 0.82	6.53 ± 1.70	**0.009**
LVPWd (Z)	-1.12 ± 0.59	-0.35 ± 1.05	**0.002**
LVM (g)	77 ± 24	75 ± 34	0.691
LVMI (g/m^2)	53 ± 10	52 ± 14	0.615
IVRT (ms)	49 ± 18	62 ± 11	**0.003**
MV E/A ratio	2.05 ± 0.63 (n=26)	2.36 ± 1.06 (n=26)	0.328

Myocardial deformation evaluated by 2D speckle tracking

2D speckle tracking derived strain (rate) parameters	CAH patients (mean ± SD)	Controls (mean ± SD)	P-value
Global SL (%)	-20.4 ± 2.0	-19.5 ± 2.1	0.093
Global SrL (1/s)	-1.24 ± 0.15	-1.21 ± 0.16	0.520
Global SR (%)	53 ± 14 (n=23)	46 ± 10 (n=20)	0.253
Global SrR (1/s)	2.58 ± 0.79 (n=22)	2.06 ± 0.29 (n=20)	**0.046**
Global SC (%)	-17.5 ± 4.2 (n=23)	-19.1 ± 3.3 (n=22)	0.350
Glocal SrC (1/s)	-1.55 ± 0.26 (n=22)	-1.43 ± 0.25 (n=20)	0.264
Time to Peak Global SL (%)	35 ± 2	35 ± 3	0.755
Time to Peak Global SR (%)	33 ± 4 (n=23)	33 ± 4 (n=20)	0.631
Time to Peak Global SC (%)	34 ± 4 (n=23)	32 ± 3 (n=22)	0.305

Electrocardiogram

- Normal heart rhytm
- No signs of LV hypertrophy
- IRBBB in cohort of CAH patients: 25.9%

Association of cardiac function with BMI and hormonal control
No associations were found between left ventricular parameters and BMIS SDS, hydrocortisone dose, androstenedione and 17-OH-progesterone, respectively.

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Adrenal

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