Study of Cardiovascular Risk Factors and Carotid Intima-media Thickness in Children with Congenital Adrenal Hyperplasia

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Introduction

• Congenital Adrenal Hyperplasia (CAH) is the commonest cause of Disorder of Sex development (DSD). It is a group of autosomal recessive disorders caused by deficiency of enzymes involved in synthesis of cortisol, aldosterone or both.

• The combination of hypocortisolism, hyperandrogenism and adrenal medullary hypofunction due to the disease and side effects of steroids treatment may make these individuals more prone to develop cardiovascular disorders including impaired exercise performance and increased systolic blood pressure.

• Ultrasonographic assessment of Carotid Intima-media Thickness (CIMT) is a well-established examination for screening individuals at cardiovascular risk.

Objectives

• To evaluate the cardiovascular risk factors including assessment of biochemical parameters and Carotid Intima-media Thickness in children with CAH.

Methods

• This study included 30 children diagnosed with CAH for 2 years or more attending the Endocrinology clinic in Alexandria University Children's Hospital, Egypt and they were compared with 30 apparently healthy children of matched age and sex.

• Thorough history taking and clinical examination were done with emphasis on anthropometric measurements and blood pressure.

• Laboratory investigations were done including lipid profile and Insulin resistance index was assessed using homeostatic model assessment (HOMA-IR).

•High-resolution B-mode Ultrasonography was performed to measure the CIMT and evaluate the colour Doppler flow characteristics of the carotid arteries.

Results

• We had 19 females and 11 males with CAH. Their mean age was 6.6 years. No significant difference was found in the age, sex or blood pressure between the cases and controls.

• About 13% of cases of CAH had high cholesterol levels. It was found that 11 cases had HOMA-IR between 75-95 th percentiles and 3 cases above 95th percentiles.

• The mean CIMT in cases was significantly higher than that of control ($p < 0.001$).

Distribution of the studied cases according to Laboratory Investigations

Lipid Profiles	No.	%
Total cholesterol (up to 200 mg/dl)		
Normal	26	86.7
High	**4**	**13.3**
Min. – Max.	117.0 – 223.0	
Mean ± SD.	157.37 ± 29.21	
TG (up to 150 mg/dl)		
Normal	30	100.0
High TG	0	0.0
Min. – Max.	27.0 – 126.0	
Mean ± SD.	72.77 ± 25.70	
HDL (≥ 35 mg/dl)		
Normal	30	100.0
Low HDL- CHOL	0	0.0
Min. – Max.	37.0 – 79.0	
Mean ± SD.	54.70 ± 9.75	
LDL(< 140mg/dl)		
Normal	28	93.3
High LDL- CHOL	**2**	**6.7**
Min. – Max.	45.0 – 148.0	
Mean ± SD.	86.40 ± 26.39	

Distribution of the studied cases according to HOMA-IR

HOMA - IR	No.	%
Min. – Max.	0.25 – 3.54	
Mean ± SD	1.15 ± 0.75	
Percentiles		
< 25	4	13.3
25 – 50	4	13.3
50 – 75	8	26.7
75 – 95	11	36.7
> 95	3	10.0

Comparison between the two studied groups according to mean CIMT

	Cases (n = 30)	Control (n = 30)	t	p
Mean CIMT (cm)				
Min – Max.	0.041 – 0.064	0.037 – 0.052	5.257*	**<0.001***
Mean ± SD.	0.051± 0.006	0.044± 0.004		

t, p: t and p values for **Student t-test** for comparing between the two groups

*: Statistically significant at **p ≤ 0.05**

Conclusions

• Children with CAH have higher mean levels of CIMT so more liable for cardiovasular risks. We recommend screening of those cases to decrease morbidity and mortality.

References

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