The Investigation of Oxidative Stress-Related Parameters in Congenital Hypogonadism

Haymana C[1], Aydogdu A[1], Soykut B[2], Erdem O[2], Ibrahimov T[1], Dinc M[1],

Meric C[1], Taslipinar A[1], Basaran Y[1], Sonmez A[1], Azal O[1]

[1]Department of Endocrinology and Metabolism, Gulhane School of Medicine, 06018 Etlik Ankara TURKEY
[2]Department of Pharmaceutical Toxicology, Gulhane School of Medicine, 06018 Etlik Ankara TURKEY

OBJECTIVES

Patients with hypogonadism are at increased risk of cardiac and metabolic diseases. The pathogenesis of increased cardio-metabolic risk in hypogonadal patients is not clear. Oxidative stress plays an important role in the pathogenesis of cardio-metabolic diseases. The aim of this study was to search for any difference of the oxidative stress parameters between in patients with hypogonadism and healthy controls.

METHODS

Thirty eight male patients with congenital hypogonadotrophic hypogonadism (CHH) (mean age 21.7±1.6 years) and 44 body mass index (BMI) matched healthy male subjects (mean age 22.3±1.4 years) were enrolled. The demographic parameters, homeostatic model assessment of insulin resistance (HOMA-IR) and oxidative stress parameters such as superoxide dismutase (SOD), catalase, glutathione peroxidase (GPx) and malondialdehyde (MDA) were measured in patients and healthy controls.

Table-1: The demographic and metabolic parameters of the patients with CHH and the healthy control subjects

	Patients (n=38) (mean±S.D.)	Healthy controls (n=34) (mean±S.D.)	p
Age (yr)	21.7±1.6	22.3±1.4	0.11
BMI (kg/m²)	23.7±4.8	24.9±2.7	0.25
WC (cm)	89.9±11.4	86.8±6.3	0.20
FBG (mg/dl)	86.4±13.7	88.1±7.5	0.58
LDL-C (mg/dl)	98.8±25.7	93.4±30.0	0.52
HDL-C (mg/dl)	42.2±11.7	48.4±8.7	**0.04**
Triglycerides (mg/dl)*	100.5 (80.2-193.0)	82.0 (56.5-110.5)	**0.02**
LH (mIU/mL)*	0.1 (0.07-1.32)	3.9 (2.9-4.9)	**<0.001**
FSH (mIU/mL)*	0.3 (0.3-1.4)	2.6 (1.9-3.4)	**<0.001**
Total Testosterone (ng/dl)	42.6±42.1	503.2±145.2	**<0.001**
Insulin (µIU/ml)	14.7 ± 5.9	8.6 ± 3.2	**<0.001**
HOMA-IR	3.1 ± 1.3	1.9 ± 0.7	**<0.001**
SOD*	1133.7 (384.8-1697.9)	962.1 (665.6-2000.5)	0.86
CAT	717.2 ± 178.0	566.6 ± 143.3	**<0.001**
GPx	51.04 ± 6.9	57.5 ± 7.8	**<0.001**
MDA	291.6 ± 197.7	92.0 ± 21.2	**<0.001**

RESULTS

When compared to the healthy controls, triglycerides (p=0.02), insulin, HOMA-IR, catalase and MDA levels (p=<0.001 for all) were significantly higher, and the HDL cholesterol (p=0.04), total testosterone, FSH, LH and GPx levels (p=<0.001 for all) were significantly lower in patients with CHH (Table1). There were significant correlations between the total testosterone levels and catalase (r=-0.33 p=0.01), GPx (r=0.36 p=0.007) and MDA (r=-0.47 p<0.001) levels.

CONCLUSIONS

The results of this study show that young and treatment naïve patients with hypogonadism have increased oxidative stress related parameters such as serum catalase and MDA levels. There is significant correlation between oxidative stress parameters and testosterone levels. Prospective, randomized, controlled studies with larger number of cases are needed to prove the relationship between oxidative stress and increased cardio-metabolic risk in hypogonadism.

REFERENCES:

1. Laaksonen DE, Niskanen L, Punnonen K, et al. Sex hormones, inflammation and the metabolic syndrome: a population-based study. *Eur J Endocrinol* 2003; 149: 601–608.
2. Tangvarasittichai S. Oxidative stress, insulin resistance, dyslipidemia and type 2 diabetes mellitus. *World J Diabetes* 2015; 15: 456-480.
3. Sonmez A, Haymana C, Aydogdu A, Tapan S, et al. Enothelial dysfunction, insulin resistance, and inflammation in congenital hypogonadism and the effect of testosterone replacement *Endocr J* 2015; 62: 605-613.

cemhaymana@hotmail.com