A STUDY OF INTERLEUKIN-6 GENE POLYMORPHISM AND OTHER PARAMETERS IN SIMPLE AND COMPLICATED OBESITY

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INTRODUCTION

Obesity is a highly heritable multifactorial disease that places an enormous burden on human health. Its increasing prevalence and concomitant-reduced life expectancy has intensified the search for new analytical methods that can reduce the knowledge gap between genetic susceptibility and functional consequences of the disease pathology.(1)
Genetic polymorphism is a difference in DNA sequence among individuals, groups, or populations. Sources include single nucleotide polymorphisms (SNPs), sequence repeats, insertions, deletions, and recombinations. Genetic polymorphisms may result by chance, or may be induced by external agents as viruses or radiation.(2)
IL-6 released from skeletal muscle may have beneficial effects on glucose control, but IL-6 released from adipose tissue can lead to liver insulin resistance. Adipocyte-derived IL-6 promotes adipose tissue macrophage accumulation in the absence of major changes in insulin tolerance, whereas myeloid cell-derived and muscle-derived IL-6 suppresses M1-like macrophage polarization and adipose tissue macrophge accumulation and improves insulin tolerance.(3)

AIM OF THE WORK

The aim of the work was to study interleukin-6 gene polymorphism and other clinical, laboratory, and radiological parameters to differentiate between simple and complicated obesity.

SUBJECTS AND METHODS

The study was conducted on hundred subjects aged (15-60 years), all were enrolled from those attending the Endocrinology clinic or the inpatient departments at the Alexandria Main University Hospital.
They were divided into 3 groups; Group A included 35 patients of simple obesity, group B included 35 patients of complicated obesity, and group C included 30 healthy subjects.
All subjects did laboratory investigations including IL-6 gene SNP rs1800796 polymorphism using taqman real-time PCR assay technique, CBC, urea, creatinine, ALT, AST, serum albumin, total serum bilirubin, FBS, HbA1c, uric acid, amylase, lipase, CRP, lipid profile, TSH, FT4, and they all did ultrasound abdomen.

RESULTS

There is no statistically significant difference between groups A and B regarding IL-6 gene snp rs1800796 polymorphism, But there is a statistically significant difference between both obese groups versus the group of healthy subjects (Group C).Table (2).
In the multivariate regression analysis; Age (p=0.023), and the GG allele of IL-6 snp rs1800796 polymorphism (p=0.040) are statistically significant risk factors for obesity. Table (1).

Table 1: Univariate and multivariate logistic regression analysis for obesity patients (group A + group B) regarding to different factors (n = 70 vs. 30)

	Obesity patients (n = 70)	Control group (n = 30)	Univariate OR (95%C.I)	p	Multivariate OR (95%C.I)	p
Female	52 (74.3%)	11 (36.7%)	4.990 (1.997 – 12.469)	0.001*	3.818 (0.765 –19.046)	0.102
Age (years)	41.33 ± 12.18	28.40 ± 3.24	1.216 (1.102 – 1.342)	<0.001*	1.218 (1.027 – 1.443)	0.023*
Waist circumference (cm)	98.40 ± 5.88	83.93 ± 3.39	3.228 (1.392 – 7.489)	0.006*		
Hip circumference (cm)	107.3 ± 5.40	94.77 ± 2.65	3.822 (1.627 – 8.980)	0.002*		
Waist /Hip ratio	0.91 ± 0.03	0.89 ± 0.03	9.389$ (2.329 –37.844)	0.002*		
HBA1c	5.83 ± 0.75	5.23 ± 0.12	1.631$ (1.304 – 2.040)	<0.001*		
Total cholesterol	186.4 ± 39.24	153.0 ± 21.13	1.033 (1.015 – 1.050)	<0.001*	0.996 (0.944 – 1.050)	0.875
Triglycerides	131.5 ± 67.06	61.67 ± 7.27	1.077 (1.034 – 1.122)	<0.001*	1.039 (0.948 – 1.139)	0.412
LDL	109.0 ± 33.99	89.33 ± 15.37	1.026 (1.008 – 1.045)	0.005*	1.036 (0.969 – 1.108)	0.300
VLDL	26.74 ± 13.28	12.33 ± 1.92	1.391 (1.167 – 1.658)	<0.001*	1.068 (0.690 – 1.652)	0.768
CRP	9.74 ± 17.06	3.87 ± 0.47	1.249 (1.040 – 1.500)	0.018*		
GG	50 (71.4%)	7 (23.3%)	8.214 (3.045 – 22.158)	<0.001*	5.918 (1.083 –32.333)	0.040*
Fatty liver with/ without pancreas	46 (65.7 %)	4 (13.3%)	12.458 (3.895 –39.845)	<0.001*	0.996 (0.143 – 6.918)	0.996

Quantitative data was expressed using Mean ± SD. Qualitative data was expressed using Number (%)
OR: **Odd`s ratio**   C.I: Confidence interval   LL: Lower limit   UL: Upper Limit $: for each 0.1
p: p value for **Odd`s ratio** for comparing between the studied groups   *: Statistically significant at p ≤ 0.05

Table 2: Comparison between the three studied groups according to IL-6 SNP

	Group A (n = 35)		Group B (n = 35)		Group C (n = 30)	
	No.	%	No.	%	No.	%
IL-6 SNP						
CC	2	5.7	1	2.9	4	13.3
CG	9	25.7	8	22.9	19	63.3
GG	24	68.6	26	74.3	7	23.3
Sig. bet. grps.	MCp1=0.836,MCp2=0.001*,MCp3<0.001*					
HWE	0.376		0.693		0.126	
Allele						
C	13	18.6	10	14.3	27	45.0
G	57	81.4	60	85.7	33	55.0
Sig. bet. grps.	p1=0.494,p2=0.001*,p3<0.001*					

Group A: Patients with simple obesity   Group B: Patients of complicated obesity
Group C: Healthy subjects serve as control group

CONCLUSION

IL-6 gene polymorphism snp rs1800796 is a risk factor for obesity, more studies are needed in this field.

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