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Original Research Paper

Clinical Research

LEPTIN AND C PEPTIDE LEVELS IN PATIENTS OF NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD)

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ABSTRACT

Leptin and C Peptide levels in patients of Non-alcoholic fatty liver disease (NAFLD)

Introduction - Non-alcoholic fatty liver disease (NAFLD) is a prevalent condition associated with obesity and insulin resistance (IR).In insulin resitance C peptide levels are raised and that may be affected by leptin levels . Leptin is involved in peripheral insulin resistance and has a potential dual action on NAFLD experimental models, exerting a possible anti-steatotic, but also a proinflammatory and profibrogenic action.

Aims and Objectives- To estimate serum Leptin and C-peptide levels in patients of non alcoholic fatty liver disease (NAFLD)

Material and Methods- A case control study was conducted in 50 patients of non alcoholic fatty liver disease (NAFLD) in the deptt of biochemistry, VMMC and Safdarjung Hospital, New Delhi.

Serum Leptin and C-peptide levels were measured using Elisa kit.

50age and se matched people were taken as controls.

Results- Serum leptin and c peptide levels were significantly higher in cases as compared to controls(p value<0.005).

Conclusion- Obesity has been recognized as a risk factor the development of chronic liver disease caused by a variety of etiologies including NAFLD. This conditions has been associated with high serum leptin and c peptide levels. Further well-controlled studies in large number of patients are needed to elucidate whether leptin and c peptide have any diagnostic role in NAFLD patients.

KEYWORDS : Non-alcoholic fatty liver disease (NAFLD), Leptin, C-peptide

Introduction

Non-alcoholic fatty liver disease (NAFLD) is a term and encompasses the simple deposition of adipose tissue in the liver to more progressive steatosis with associated hepatitis, fibrosis, cirrhosis, and in some cases hepatocellular carcinoma (HCC)[1]. Although the natural history of NAFLD remains incompletely characterized, what is clear from the published data is a risk of progression to cirrhosis and HCC[2]. The exact prevalence of NAFLD is not known because of its indolent and silent course. The pathogenesis of NAFLD is yet to be clearly elucidated, but the most prevailing general theory is the two "hit-hypothesis" proposed by Bacon,1994.3 The first "hit" is thought to be an accumulation of fat(steatosis), especially fatty acids and triglycerides within the liver cell followed by cellular adaptations and altered signaling pathways that lead to increased oxidative stress on the cell and the second "hit", possibly secondary to environmental and/or genetic factors with subsequent apoptosis or more likely cellular necrosis[3].

Leptin - the ob gene product - is a circulating 16-kDa peptide hormone secreted mainly by adipocytes of white fat tissue. It regulates food intake, body fat, insulin action, thermogenesis, induction of angiogenesis, and modulation of the immune system. Leptin synthesis in adipocytes is regulated by several hormones[4]. It is involved in peripheral insulin resistance and strongly related to body fat composition[5]. NAFLD is also related to insulin resistance and, thus, it is frequently found in individuals who have central obesity or diabetes. Insulin resistance and excess adiposity are associated with increased lipid influx into the liver and increased *de novo* hepatic lipogenesis, promoting hepatic triglyceride accumulation[6]. Several studies showed that circulating leptin levels increase in cirrhosis and obesity[7]. Leptin may have a role in the regulation of fat deposition, fibrogenesis, and inflammation in patients with NAFLD[8].

Obesity and insulin resistance are among important risk factors for NAFLD. C-peptide levels can be used to measure insulin secretion. However, there is limited evidence of the association between NAFLD and C-peptide level[9]. Both C-peptide and insulin are produced and released in equimolar amounts. C-peptide can therefore be used to assess endogenous insulin secretion. In addition to diabetes and insulin resistance, C-peptide has been associated with many risk factors for NAFLD including cardiovascular diseases and metabolic syndrome.

Therefore, the primary objective of this study is to determine Leptin and C-peptide in NAFLD and to find their correlation, if any.

MATERIALS and METHODS

The present study was conducted in the deptt of Biochemistry, Vardhaman Mahavir Medical College & Safdarjung Hospital, New Delhi. Study group was divided into two-

Cases- 50 persons of diagnosed NAFLD were taken as cases

Controls- 50 age and sex matched healthy persons were taken as controls

In this study, diagnosis of NAFLD is made liver functions are found abnormal and there is hepatic steatosis on ultrasound or computed tomography [CT] in the absence of causes for secondary steatosis, such as excessive alcohol consumption (> 20 grams/day in females and 30 grams/day in males) or chronic liver conditions associated with steatosis (viral, autoimmune, metabolic and toxic disorders).

Methodology

Serum Leptin and C-Peptide were measured in cases and controls by ELISA .

RESULT

Baseline characteristics of cases and controls are compared and presented in table-1. Serum cholesterol (254.4±10.08 vs 189.2±5.56), Triglyceride (167.67±8.06 vs120.64±7.45) and LDL (152.36±9.56 vs112.89±6.45) are higher in cases as compared to controls.

Table- 1

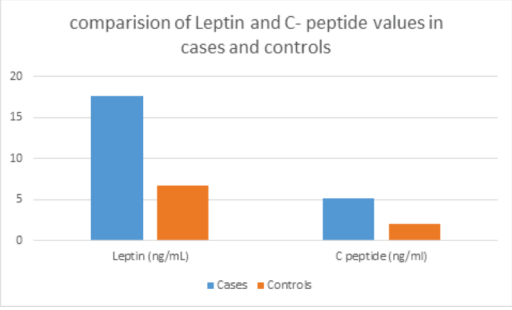
	NAFLD	Control	P value
Number	50	50	
Age	42.6±8	44.5±6	>0.05
Gender(F/M)	26/24	25/25	
cholesterol	254.4±10.08	189.2±5.56	<0.05
Triglyceride	167.67±8.06	120.64±7.45	<0.05
HDLc	49.06±4.02	41.78±4.01	>0.05
LDL	152.36±9.56	112.89±6.45	<0.05
Glucose(F)	94.6±9.56	92.5±8.76	>0.05

Serum leptin (17.6±3.2vs 5.7±1.8) and c-Peptide (5.2±1.3 vs2.1±0.6) levels are significantly higher in cases than in controls.

Table-2

	Cases	Controls	P value
Leptin (ng/mL)	17.6±3.2	5.7±1.8	<.001
C peptide	5.2±1.3	2.1±0.6	<.005

FIGURE -1



Discussion

Serum leptin and C – peptide levels are significantly raised in cases than in controls. Non-alcoholic fatty liver disease (NAFLD), the hepatic manifestation of Metabolic Syndrome(MS) became world epidemics along with other MS components such as diabetes, obesity, and leptin resistance[11]. Leptin is exclusively expressed in adipose tissue and secreted from white adipose cells[12]. Leptin can regulate the development of NAFLD indirectly, centrally acting on multiple neurons through leptin receptors (LepR) in the brain and involve in anorexigenic peptide expression, or directly binding LepR in peripheral and implicated in a broad range of physiological processes[13].

Obesity has been recognized as a risk factor the development of chronic liver disease caused by a variety of etiologies including chronic HCV infection, alcohol, and NAFLD. These conditions have been associated with high serum leptin levels indicating leptin insensitivity or resistant[14,15]. leptin is inextricably related to Insulin Resistance(IR). It has been suggested that leptin may contribute to hepatic steatosis by promoting IR and by altering insulin signaling in hepatocytes, so as to promote increased intracellular fatty acids. At a later stage, leptin may cause hepatic steatosis to turn into steatohepatitis by amplifying selected proinflammatory response[16]. Insulin resistance is a well-known condition commonly found in NAFLD patients. Previous studies often found that C-peptide levels are raised in patients with NASH[17] However, the application of C-peptide as a biomarker for interventions designed to improve insulin sensitivity remains to be determined. C peptide has a role not only as an independent risk factor for NAFLD but can also be useful for screening or monitoring the degree of insulin resistance in NAFLD in the general population.

Conclusion

Leptin and C peptide have a role in pathogenesis as well as in diagnosis of NAFLD. However more studies with large number of patients are required to validate these findings.

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