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To Study the Levels of Homa-IR in Patients with Non-Alcoholic Fatty Liver Disease

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Abstract: ***The aim of study was to measure serum level of HOMA-IR in NAFLD and compare with healthy control subjects. In this study 90 NAFLD and 90 healthy subjects (age and gender matched) were enrolled. BMI, Glucose, Insulin and HOMA IR were assessed. HOMA-IR levels were higher in NAFLD subjects compared with healthy controls (***3.4 ± 0.9***vs*** 1.2 ± 0.5***, respectively, P<0.0001). Increased levels of HOMA-IR in NAFLD other than healthy subject.***

Keywords: HOMA-IR, NAFLD

1. Introduction

NAFLD is defined as the accumulation of excessive fat in the liver of patients without history of alcohol abuse or other causes of hepatic steatosis. NAFLD comprises a wide spectrum of diseases ranging from simple steatosis (SS) (i.e., fat accumulation in the liver) to Nonalcoholic steatohepatitis (NASH), which leads to variable grades of fibrosis and ultimately cirrhosis with its complications including Hepatocellular carcinoma (HCC) (Buzzetti E et al. 2016). NAFLD is characterized by mild to moderate increase in aspartate transaminase (AST), alanine transaminase (ALT), or both. Increased γ-glutamyl transferase (GGT) and serum alkaline phosphatase (ALP) can also be observed (Angulo P. 2002).

HOMA-IR stands for **Homeostatic Model Assessment of Insulin Resistance.** The meaningful part of the acronym is "insulin resistance". It marks for both the presence and extent of any insulin resistance that you might currently express. It is a terrific way to reveal the dynamic between your baseline (fasting) blood sugar and the responsive hormone insulin.

Although there are many evidences linking obesity, insulin resistance and NAFLD. Data about level of HOMA-IR concentration in NAFLD is limited. Therefore, present study was undertaken to evaluate HOMO-IR levels in patients with NAFLD and to compare it with healthy controls.

2. Materials & Methods

The present study was conducted on USG proven Non-alcoholic fatty liver disease (NAFLD) patients admitted or attending Department of General Medicine, J.L.N. Medical College, Ajmer. Diagnosis of NAFLD was confirmed by an experienced physician. Anthropometric parameters and other variables i.e. Age, Weight, Height, Body mass index (BMI), systolic and diastolic blood pressure were measured. Smoking status and alcohol consumption were also noted in the present study. Venous blood sample was obtained by aseptic technique in plain tubes. Serum was separated by centrifugation at 2500 RPM for 10 minutes and stored in labeled tubes. Consent from all the subjects was obtained for the study.

3. Results and Observation

In this study, 90 cases of NAFLD were compared with 90 healthy controls.

Table 1: Anthropometric parameters of NAFLD subjects & Healthy controls

Parameters	NAFLD Cases (Mean ± SD)	Healthy Controls (Mean ± SD)	P-Value
AGE (yrs)	49.7 ± 7.35	50.42 ± 8.05	0.644 (NS)
WEIGHT (kg)	51.0± 5.9	73.34 ± 4.5	-
HEIGHT (cm)	155.72 ± 5.1	157.52 ± 1.2	-
BMI (kg/m2)	21.20 ± 5.13	29.4 ± 3.86	<0.001 (HS)

Table 2: Biochemical parameters of NAFLD subjects & Healthy subjects

Parameters	NAFLD Cases (Mean ± SD)	Healthy Controls (Mean ± SD)	P-Value
S. GLUCOSE (mg/dl)	105.0 ±15.45	85.0 ± 12.03	<0.0001 (HS)
S.INSULIN (mIU/L)	13.0 ± 3.05	5.50 ± 1.42	<0.0001 (HS)
HOMA - IR	3.4 ± 0.9	1.2 ± 0.5	<0.0001 (HS)

P value <0.0001 is considered highly significant while p<0.01 is considered significant

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Basic anthropometric parameters of NAFLD subjects and healthy subjects are summarized in table-1. There was no significant difference between NAFLD subjects and healthy subjects regarding mean age (49.7 ± 7.35 vs. 50.42 ± 8.05 yrs). BMI mean ± SD in kg/m^2 in NAFLD and healthy subjects was (21.20 ± 5.13 vs. 29.4 ± 3.86) and it was highly significant. Biochemical parameters of NAFLD subjects and healthy subjects are presented in table-2. NAFLD subjects had higher HOMA-IR levels compared to healthy subjects (3.4 ± 0.9vs 1.2 ± 0.5, P<0.0001).

4. Discussion

In the present study, NAFLD subjects have significantly higher levels of HOMA-IR as compared to healthy control subjects. A number of articles have reported increased levels of HOMA-IR in NAFLD and obese patients, but NAFLD subjects have not been studied extensively to know whether the increase in HOMA-IR levels begin before the onset of NAFLD. Our result was inconsistent with **Luciana de Carvalho et al (2005)** and **Thomas Reinehr et al (2008)** also looked at the association of HOMA-IR with BMI and waist circumference, and found positive univariate correlations of HOMA-IR with hepatic triglyceride content as well as BMI and waist circumference; nevertheless, in the multivariate regression analysis after adjusting for hepatic triglyceride content, neither BMI nor waist circumference were independent predictors of HOMA-IR, which suggests that their relationship with HOMA-IR might be mediated mostly by an increase in intrahepatic triglycerides.. Results of this study suggest that levels of HOMA-IR are increased in patients with NAFLD.

5. Limitations of Study

Our sample size was relatively small.

6. Acknowledgements

NIL

7. Conflicts of Interest

We have no competing interests.

8. Funding

NIL

9. Conclusion

From the present study it is concluded that HOMA-IR levels gets increased prior to onset of NAFLD. Moreover the relation between the HOMA-IR and the liver may act as a major player in the link between the metabolic syndrome, diabetes mellitus and the NAFLD. It could be considered among therapeutic agents used in the prevention of NAFLD and in the prevention or reduction of its critical complications.

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