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Original Research Article

A PROSPECTIVE STUDY ON SERUM LEPTIN AND RESISTIN IN TYPE 1 AND TYPE 2DIABETES MELLITUS

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Abstract

Background: Leptin is a hormone, secreted by adipocytes that control the food intake. It is an anorexigenic hormone, which leads to the suppression of appetite. Obesity is characterized by hyperleptinemia due to the development of leptin resistance 1. Resistin is a adipokine, resisting insulin secreted from scortal cell and macrophages of adipose cell. Diabetes is a chronic disorder presenting with high blood sugar values, either due to less production of insulin or insulin insensitivity. These adipokines have a direct correlation with diabetes. So their levels tend to vary in diabetes. Aim: To estimate the levels of Serum Leptin, Resistin, Insulin, FBS and lipid profile in Type 1 and Type 2 diabetes mellitus patient.

Material and methods: A cross sectional analytical studies was conducted in DR B R AMC. Study group included 80 known case of diabetes mellitus. 40 patients type 1 DM in group 1 and 40 patients with Type 2 DM was included as group 2.

Results: BMI, FBS, Lipid profile had no significant difference among both the groups. Insulin was high in type 1 diabetes mellitus, but with no statistical significance. Leptin levels are significantly high in Type 1 DM compared to type 2 DM. However Resistin didn't show any statistical difference between both the groups.

Conclusion: Leptin and resistin are from adipocytes with high levels in Diabetes mellitus related to high BMI. They have significant roles as proinflammatory markers and influence in prognosis of Diabetes mellitus.

Keywords: leptin, resistin, insulin, diabetes mellitus.

Introduction

Obesity is a important health concern and a risk factor for developing diabetes

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mellitus, insulin resistance and metabolic syndrome. Obesity is characterized by hyperleptinemia due to the development of leptin resistance 1. Leptin stimulates the inflammatory process, oxidative stress, atherogenesis, and thrombosis, promoting endothelial dysfunction, arterial stiffness and arteries become prone for atherosclerosis. Hyperleptinemia has been linked to insulin resistance, T2DM, and diabetic vascular complications. Leptin predisposes to vascular inflammation, oxidative stress, endothelial dysfunction, cardiac remodeling, and insulin resistance. It induces arteriosclerosis, angiogenesis and atherosclerosis2.

There is improvement in leptin hypothalamic sensitivity in relation to metformin therapy. In vitro, studies showed metformin reduced reactive oxygen species production, smooth muscle cell proliferation and muscle cell proliferation and matrix metalloproteinase-2-expressions3.

Resistin is a adipokine with cysteine rich amino-acids involved in inflammation. As the name suggests it resist the action of insulin, more importantly in obese individual. It is a proinflammatory molecule that plays a crucial role in the pathogenesis of diabetes and its complication. 7

Materials and Methods

A cross sectional, analytical study was conducted in Jan 2021 to April 2021 in Dr B R Ambedkar Medical College, Bengaluru. Sample size was 80 patients who were known case of Diabetes mellitus. 40 patients of Type 1 DM, considered as group 1 and 40 patients of Type 2 DM, considered as group 2 were included in the study. Male and female with age group between 30-60 yrs were included in the study. 23 males and 17 female were present in group 1. 21 males and 19 females were present in group 2. Patients with endocrine disorder, family history of obesity, smoking, gestational diabetes, malignancy, alcoholics were excluded from the study.

After detail history, physical examination was done to determine the BMI. 5 ml of fasting blood was collected from both the groups and was analysed for Fasting blood sugar, total cholesterol, Triglyceride (TGL), High density lipoprotein (HDL) using auto anlayser. Serum insulin, Leptin and Resistin was estimated by Elisa method using Alere Elisa reader and washer. Very low density lipoprotien was calculated by formula TGL/5. Low density lipoprotein (LDL) was calculated by Friedewald formula = Total Chol- (HDL+VLDL). Statistical analysis was done using SPSS program. Results: The table shows that age matched Total number of male included in the study was 44 and 36 female was included. BMI in group 1 that is in type 1 Diabetes mellitus was significantly high than in type 2 Diabetes mellitus. Both groups high blood sugar and lipid profile, but didn't show statistical difference.

VLDL was high in type 2 diabetes mellitus. Insulin levels and resistin are high in type 1 DM but didn't show statistical difference. Leptin levels showed raised values in type 1 DM compared to Type 2 DM.

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Table 1:

	Group1	Group2	P values
	Mean ± SD	Mean ± SD	
Age	48.3 ± 8.1	46.5 ± 7.4	0.310
BMI	31.2 ± 3.8	29.1 ± 4.5	0.032
FBS	212.2 ± 49.2	210.9 ± 51.8	0.914
TGL	185.6 ± 66.4	196.6 ± 67.1	0.464
TCHOLES	212.8 ± 63.8	221.5 ± 64.6	0.543
HDL	41.3 ± 14.5	37.2 ± 12.5	0.175
LDL	129.8 ± 61.3	132.2 ± 63.9	0.868
VLDL	37.1 ± 13.2	49.5 ± 32.7	0.028
INSULIN	19.8 ± 29.7	11.8 ± 15.8	0.108
LEPTIN	14.7 ± 4.2	12.2 ± 6.5	0.045
RESTIN	7.0 ± 2.8	6.8 ± 2.2	0.722

Note: P value of < 0.05 is significant

Results and Discussion

Hyperinsulinemia and Hyperleptinemia is a feature of Diabetes mellitus, but this showed it is high in Type1 Insulin dependent diabetes mellitus compared to type 2 non insulin dependent diabetes mellitus. Non significant hyperinsulinemia was found in type 1 DM, may be due to insulin resistance seen in type 1 DM. Resistin , though a proinflammatory marker didn't show changes in both groups. I can also be a compensatory hyperinsulinemia , which occurs when pancreatic β cell secretion increases to maintain normal blood sugar level in the setting if pheripheral insulin resistance in muscle and adipose tissue 16. Leptin is a 16K Da, non glycosylated polypeptide 167 amino acid. It is a product of ob gene, predominantly expressed in white adipose tissue. Higher concentration of leptin is detected in obese individual inhibiting appetite and reducing food intake 9. Leptin has a important regulator role in expression and activity of key enzymes including glucokinase, phosphoenolpyruvate carboxykinase and promotes myotube glucose transporter. Leptin increases glucose oxidation which has a role in reducing glucose levels 10.

Leptin deficiency has implicated to plays role in severe insulin resistance and diabetes phenotype of genetic disorders that impair adipogenesis such as lipodystrophy 11. Acquired leptin deficiency occurs in uncontrolled insulin deficient Type 1 Diabetes mellitus. Insulin, which is required for regulation of lipogenesis and lipolysis , the deficiency of which causes uncontrolled mobilization of stored triglyceride and depletion of body fat stores. Progressive loss of adipose tissue is accompanied by a pronounced decrease in leptin levels, resulting in deficiency of all known adiposity signals 12. Strong correlation was found between interleukin 6, tumor necrosis factor-**α**, leptin and C reactive protein, suggest that cytokines in obese subjects may play a role in increase in inflammatory protein secreted by liver 13.

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Resistin is cystein rich, 94 amino-acid polypeptide, an adipokine, self explaining hormone secreted from scrotal cell and macrophages of adipose tissue. It activates supressor of cytokine signalling-3, an anti-inflammatory mediator, which supress insulin signaling in several tissues. 14. The expression of resistin is widely recognized as pro inflammatory cytokines in pheripherla blood mononuclear cells, like TNF-α, interleukin-6, C reactive protein or monocyte chemoattractant protien-1 is upregulated by resitin 8. Xuemig Peng et al, showed that there is raised leptin in mild obesity related diabetes and Resistin is elevated in severe insulin resistant diabetes and closely related to diabetic nephropathy. Resistin decreases neutrophil chemotaxis and oxidative stress via inhibition of the P13K signalling pathway to increase kidney damage in vitro 15.

Leptin and resistin are adipocytokines that influence insulin sensitivity, and inflammation, which are closely involved in development of T2DM. No Significant difference in resistin concentrations was identified between patients with T2DM with normal BMI and those with obesity, following adjustment of waist circumference and BMI. 4. Kocot et al did not find any differences in resistin concentrations between BMI groups. 5. In contrast, Mabrouk et all found that resistin was higher in obese patients with diabetes than in obese non diabetics 6. The prognosis of Diabetes mellitus in relation to adipokines are yet to be analysed in a prospective study. Need a vast study in multicentre places to evaluate the adipokines in relation to gender, different socio economic status in relation to culture, food habits and genetic predisposition.

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