Original Research Paper

Volume - 13 | Issue - 09 | September - 2023 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Biochemistry

ASSOCIATION OF SERUM HDL, HSCRP AND VITAMIN-D LEVELS WITH SERUM LEPTIN IN OBESE NONDIABETIC AND DIABETIC POSTMENOPAUSAL WOMEN

Dr. Vanita Sonagara* B.D.S, MSc, PhD Scholar, Department of Biochemistry, Dr.Sampurnanand Medical College, Jodhpur *Corresponding Author

Dr. Ranjana Mathur MBBS, MD, Ex. Sr. Professor and Ex. HOD Department of Biochemistry, Dr. Sampurnanand Medical College, Jodhpur

ABSTRACT **Introduction:** Menopause is a natural event in the aging process and signifies the end of reproductive years with cessation of cyclic ovarian functions as manifested by cyclic menstruation. A complex and mostly undiscovered combination of genetic, hormonal, and environmental factors govern the functional lifespan of human ovaries. Leptin is positively connected with obesity and insulin resistance. Leptin levels are found to be higher in the females of obese diabetics and nondiabetics. Higher serum leptin levels has been found to be linked to greater rates of hypertension and dyslipidemia. **Material and methods:** In this study, 150 obese nondiabetic (Group-I) and 150 obese diabetic (Group-II) postmenopausal women were recruited. Blood samples were collected and were processed for biochemical investigations by standard protocol using commercially available reagents and kits on fully automatic chemistry analyzer, ELISA and Chemiluminescence analyzer. **Results:** In present study, 150 were obese postmenopausal nondiabetic (Group-I) and 150 obese postmenopausal type 2 diabetic (Group-II) women were included. In our study, mean serum leptin of the Group-I subjects, was 23.4±1.59 ng/mL, and 32.3±3.16 ng/mL in Group II subjects. Serum leptin levels was found to be significantly higher among Group-II subjects ($p<0.0001$). The correlation of serum leptin with HDL, and vitamin-D, among Group-I and Group-II was negatively associated. The correlation of serum leptin with hsCRP among Group-I and Group-II was positively associated. The association of serum leptin with serum HDL among Group-I and Group-II women was significant ($p=0.033$ and 0.003 respectively). **Conclusion:** Diabetic postmenopausal obese women had significantly higher levels of leptin. Higher leptin levels association with low vitamin-D levels justify progression to osteoporosis.

KEYWORDS : hsCRP, Leptin, Menopause, Postmenopausal women.

INTRODUCTION

Menopause is defined as the point of time when menstrual cycles permanently cease due to the natural depletion of ovarian oocytes from aging. After the woman has missed her period for 12 consecutive months, the diagnosis is often established retroactively. It signifies the end of fertility permanently and is characterised by low oestrogen production, which affects body mass index and changes the distribution of adipose tissue, leading to an insufficient energy expenditure as well as insulin secretion and insulin sensitivity, both of which can predispose to the development of T2DM (1).

Leptin is a key hormone regulating energy intake and expenditure through controlling appetite and glucose metabolism. Circulating leptin levels which is secreted by adipocytes, directly reflects total amount of fat in the body. Higher serum leptin levels has been found to be linked to greater rates of hypertension and dyslipidemia. In hypertensive patients in India, a recent study found a substantial correlation between leptin and hypertension (2). Regardless of the presence of T2DM, a different recent study linked elevated leptin levels with a higher risk of obesity in men than in women (3).

In present study, we tried to find out serum leptin differences among obese postmenopausal nondiabetic and diabetic women and correlation of serum leptin levels on serum HDL, hsCRP and vitamin-D levels.

MATERIAL AND METHODS

The present cross-sectional observational study was conducted on post-menopausal women, attending the out patient Department of Obstetrics and Gynecology and Department of Medicine Dr. S.N. Medical College and its associated group of Hospitals, Jodhpur. All the investigation work will be performed in the Department of Biochemistry, Dr. S.N. Medical College Jodhpur.

The inclusion criteria was post-menopausal obese women who have stopped having menstrual bleeding one year ago. The subjects with chronic kidney disease, liver disease, hysterectomy, on medication for CVD, on Vitamin D supplementation and history of hormone replacement therapy were excluded. In this study 150 nondiabetic (Group-I) and 150 diabetic women (Group-II) were recruited. Blood samples were collected and were processed for biochemical investigations by standard protocol using commercially available reagents and kits on fully automatic chemistry analyzer, ELISA and Chemiluminescence analyzer.

Statistical Analysis

Student's 't' test values were used to calculate the size of the between-group differences for each of the parameters.The significance of variance between the mean values of various parameters among the studied groups of subjects was ascertained using t-values and 'p' values (probability).

RESULTS

In present study, a total of 300 obese postmenopausal women were recruited. Out of 300, 150 were nondiabetic and 150 were type 2 diabetic.

Mean Serum leptin of the Group-I subjects, was 23.4±1.59 ng/mL; which renged from 20.63 to 26.54 ng/mL. It was 32.3±3.16 ng/mL in Group II postmenopausal subjects that ranged from 26 to 38 ng/mL. Serum leptin levels was found to be significantly higher among Group-II subjects ($p<0.0001$). **[Table: 1].**

Table 1: Mean leptin levels (ng/mL) among the group studied

S. No.	GROUP STUDIED	LEPTIN (Mean±SD) [Range]	P value
1.	Obese Non-diabetic Postmenopausal women	23.4±1.59 [20.63-26.54]	<0.0001 (HS)
2.	Obese Type2 Diabetic Postmenopausal women	32.3±3.16 [26.0-38.0]	

HS- Highly Significant

The correlation of serum leptin with HDL among Group-I and Group-II was negatively associated (r = -0.12 and -0.184 respectively). The association of serum leptin with serum HDL among Group-II women was significant (p=0.024). The correlation of serum leptin with hsCRP among Group-I and Group-II was positively associated (r = 0.014 and 0.17 respectively).. The association of serum leptin with serum hsCRP among Group-II women was significant (p=0.030). The correlation of serum leptin with vitamin-D among Group-I and Group-II was again negatively associated (r = -0.173 and -0.238 respectively). The association of serum leptin with serum HDL among Group-I and Group-II women was significant (p=0.033 and 0.003 respectively). Figure 1 shows the relative differences between Group-I and Group-II with respect to leptin levels with HDL, hsCRP and vitamin D. [Figure 1]

Table 2: Correlation of Leptin with Biochemical variables in both groups

OBESE NON DIABETIC POSTMENOPAUSAL WOMEN (LEPTIN)			
S.No	Parameter	r-value	p-value
1.	HDL	-0.12	0.141[NS]
2.	HsCRP	0.014	0.899[NS]
3.	VITAMIN-D	-0.173	0.033[S]
OBESE DIABETIC POSTMENOPAUSAL WOMEN (LEPTIN)			
1.	HDL	-0.184	0.024[S]
2.	HsCRP	0.17	0.030[S]
3.	VITAMIN-D	-0.238	0.003[S]

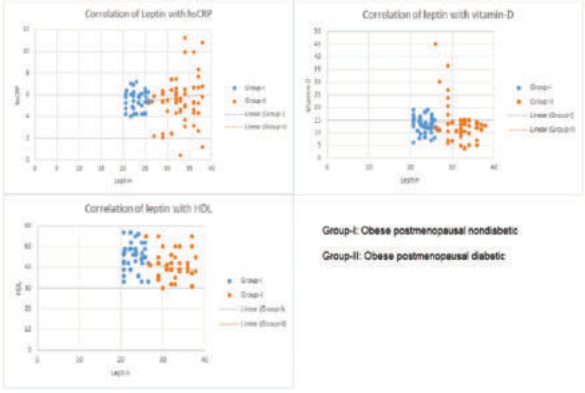

Figure 1: Correlation of leptin with HDL, hsCRP and vitamin-D among Group-I and Group-II women.

DISCUSSION

A highly significant increase was observed in the serum leptin of Group-II (t =30.73, p<0.0001) as compared to Group-I subjects. In contrast to our findings, Kassi et al. showed that leptin level was not significantly associated with diabetes among postmenopausal group (4).

This study suggests negative correlation between Leptin and Serum HDL which is non-significant in group I postmenopausal subjects and Significant in group II postmenopausal subjects. Similar research findings were presented by Maetani et al. (5). In contrast to our findings, study conducted by F. Lwow and A. Bohdanowicz Pawlak found positive correlation between leptin and serum HDL levels (r = -0.089 and p 0.117) (6).

This study suggests positive correlation between serum leptin and serum hsCRP, which is non-significant in Group I postmenopausal subjects, and significant in Group II Postmenopausal subjects. Studies conducted by Kassi et al. (4) and Shamsuzzaman et al. (7) have also shown strong positive association between leptin and hsCRP levels.

This study suggests negative correlation between serum leptin and serum VitaminD which is Significant in Group I postmenopausal subjects and Group II postmenopausal subjects. In contrast to our findings, study conducted by **F. Lwow and A. Bohdanowicz Pawlak** found negative correlation between leptin and vitamin-D levels (r = -0.153 and p 0.007) (6).

CONCLUSION

Diabetic postmenopausal obese women had significantly higher levels of leptin. Higher leptin levels association with low vitamin-D levels justify progression to osteoporosis. Significant association between serum leptin and hsCRP was found among Group-II women. Negative correlation between serum leptin and serum HDL was noted in both groups.

REFERENCES

1. Davis SR, Lambrinoudaki I, Lumsden M, Mishra GD, Pal L, Rees M, et al. Menopause. Nat Rev Dis Primers. 2015 Apr 23;1(1):1–19.
2. Mahadik SR. Association between adipocytokines and insulin resistance in Indian hypertensive patients. Indian Heart J. 2012;64(1):35–9.
3. Mirrakhimov EM, Kerimkulova AS, Lunegova OS, Mirrakhimov AE, Nabiev MP, Neronova KV, et al. The association of leptin with dyslipidemia, arterial hypertension and obesity in Kyrgyz (Central Asian nation) population. BMC Res Notes. 2014 Jun 30;7:411.
4. Kassi E, Dalamaga M, Hroussalas G, Kazanis K, Merantzi G, Zachari A, et al. Adipocyte factors, high-sensitive C-reactive protein levels and lipoxidative stress products in overweight postmenopausal women with normal and impaired OGTT. Maturitas. 2010 Sep 1;67(1):72–7.
5. Maetani M, Maskarinec G, Franke AA, Cooney RV. Association of Leptin, 25-Hydroxyvitamin D, and Parathyroid Hormone in Women. Nutrition and Cancer. 2009 Mar 9;61(2):225–31.
6. Lwow F, Bohdanowicz-Pawlak A. Vitamin D and selected cytokine concentrations in postmenopausal women in relation to metabolic disorders and physical activity. Experimental Gerontology. 2020 Nov 1;141:111107.
7. Shamsuzzaman ASM, Winnicki M, Wolk R, Svatikova A, Phillips BG, Davison DE, et al. Independent association between plasma leptin and C-reactive protein in healthy humans. Circulation. 2004 May 11;109(18):2181–5.