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Original Research Article

Correlation of Serum Leptin Levels With the Disease Activity in Rheumatoid Arthritis Patients

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Abstract: Rheumatoid Arthritis is an autoimmune disease affecting 0.5-1% of general population. Among the adipokines secreted by the adipocytes, Leptin act as a new mediator of the inflammatory process and plays a major role in the pathogenesis of Rheumatoid Arthritis. Serum Leptin levels was determined and correlated with the disease activity in the Rheumatoid arthritis patients.60 Rheumatoid arthritis patients diagnosed by American College of Rheumatology (ACR) criteria 2010 aged 25-55years were included in the study. Serum Leptin levels, Erythrocyte sedimentation rate (ESR**)** were studied and the disease severity calculated and categorised. The mean serum Leptin concentration in RA patients with high disease activity (n=26) was more (51.32± 33.81ng/mL) than that in moderate activity (n=34) (46.83±30.92ng/mL), though the difference in the mean between the two groups was not statistically significant. As the serum Leptin levels were significantly higher in the RA patients than in the controls it is understood that Leptin plays a pivotal role in the pathogenesis of RA as a proinflammatory cytokine. However no correlation was observed between serum Leptin levels and disease activity of the RA patients.
Keywords: Rheumatoid Factor, Leptin, Polyarthritis, Disease activity Score, ESR, Obesity, Inflammation, ACR criteria

INTRODUCTION

Rheumatoid Arthritis, a chronic systemic autoimmune inflammatory disorder characterised by symmetrical synovitis, polyarthritis, progressive joint damage, pain, fatigue and disability, affects 0.5-1% of general population with male-female ratio 3:1[1,2]. Recent studies have shown that the hormones secreted by the adipocytes like Resistin, Leptin and Adiponectin act as new mediators of the inflammatory process and also among them Leptin has been found to play a major role in the pathogenesis of Rheumatoid Arthritis [3]. Many clinical studies suggest the involvement of Leptin in the pathogenesis of Rheumatoid Arthritis. In this study, we have assessed the role of Leptin in Rheumatoid Arthritis and thereby aid in future prospective studies in the undesired Leptin action in autoimmune inflammatory diseases.

Aims and Objectives

The aim of the study is to determine the concentration of Leptin in the serum and to correlate it with the disease activity calculated by DAScore in Rheumatoid arthritis patients.

MATERIALS AND METHODS

Sixty RA patients diagnosed by the Rheumatologists at the Rheumatology Out-Patient department of RGGGH, Chennai were selected for this study after getting approval from institutional ethical committee. The diagnosis was based on the American College of Rheumatology (ACR) Criteria 2010 [4]. Both RF+ve and RF-ve patients were included in the study. Thirty age and sex matched controls who had no clinical evidence of RA were selected. Patients with Diabetes Mellitus, Hypothyroidsm, Hypertension, Coronary Vascular Disease and those on drugs like statins and estrogens were excluded from the study. Venous blood was collected from the patients around 9.00 am to avoid diurnal variation of Leptin in fasting state. Serum was separated, aliquoted and stored at -20˚C in the deep freezer for further testing. Serum Leptin (ELISA- Sandwich method, DRG), CRP, uric

acid, lipid profile, urea, creatinine, RF, ESR and hemoglobin were determined in all 60 patients and 30 controls. Disease activity was assessed by using the DAS 28(3) formula [5].

DAS = [0.56*√T28 + 0.28* √S28 + 0.7* ln (ESR)]* 1.08 + 0.014* GH

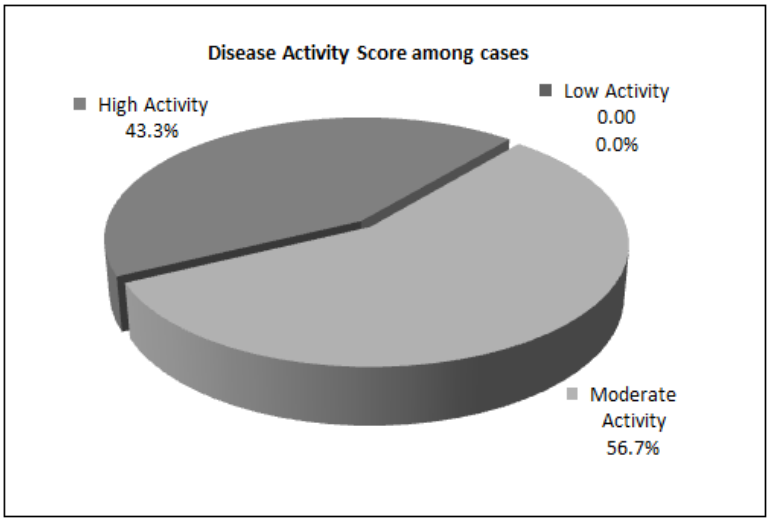
T- no. of tender joints, S- no. of swollen joints, GH – General Health

Grades of Disease activity
< 3.2 low activity
3.2 – 5.1 moderate activity
> 5.1 high activity

Statistical analysis was performed using SPSS software version 22 and the following were carried out using Unpaired student's t-test and Pearsons correlation co-efficient were done to measure the linear relationship between Serum Leptin concentration and other parameters like DAS28(3), ESR and BMI.

RESULTS AND DISCUSSION

In the study population 81.7% (49out of 60) were seen in the age group of 30-50 years of age which agrees with the literature where it is reported that 80% of the patients develop disease between 30- 50 years of age [1]. Also among the cases, female patients 86.7% (52 out of 60) predominated as said in the literature that autoimmune diseases predominate in women [2]. ESR was elevated in 80% (n=48) and was normal in 20% (n=12) of the RA patients. The disease activity score among the RA patients was moderate in 56.7% (n=34) and high in 43.3% (n=26).



Fig–1: Disease activity in cases based on the DAS 28(3) in cases.

Figure 1 shows the percentage distribution of disease activity in RA patients. 56.7% of patients had moderate disease activity with a DAS Score of 3.2 to 5.1. 43.3% of the patients had high disease activity with a DAS Score of more than 5.1.

Table–1 Comparison of serum Leptin levels between cases and controls in both males and females with RA

	Group	N	Mean	Standard Deviation	SE Mean	t-Value	P-Value
Serum Leptin levels	Case	60	48.7777	32.00198	4.13144	8.608	<0.001 S
	Control	30	11.9370	6.11431	1.11632		

S - Significant

Table 1. shows serum Leptin concentration compared between cases and controls using unpaired student's t-test. The mean serum Leptin concentration was 48.78±32.00 ng/mL in cases and 11.94±6.11

ng/mL in controls. The standard error of mean for cases was 4.13 and that of the controls was 1.12. The 95 % confidence interval for mean serum Leptin concentration in the cases was 56.88 ng/mL to 40.68ng/mL. The 95% confidence interval for mean serum Leptin concentration in the controls was 14.13ng/mL to 9.75ng/mL. The p-value obtained was less than 0.001 and it was statistically highly significant which correlated with previous studies [6].

Table−2 Comparison of mean Serum Leptin concentration between cases and controls in both sexes:

Gender	Group	N	Mean Serum Leptin levels	Standard Deviation S.D	t-Value	P-Value
Female	Case	52	49.6062	32.02568	8.039	<0.001 S
	Control	24	12.5204	6.11400		
Male	Case	8	43.3926	33.48337	2.794	0.025 S
	Control	6	9.6033	6.05893		

S – Significant

Table 2 compares the mean serum Leptin concentration between the male and female RA patients and their controls. Serum Leptin concentration among the females between cases and controls was compared using unpaired student's t-test. The mean S.Leptin concentration in female patients with RA was 49.61± 32.03ng/mL and in controls it was 12.52± 6.11ng/mL. The mean S.Leptin concentration in the female patients (n=52) was 49.60±32.03ng/mL which was higher than that of the female controls (n=24)12.52±6.11ng/mL which is statistically significant [7]. Similarly in the male patients (n=8) S.Leptin concentration is 43.39±33.48ng/mL which was higher when compared to the male controls (n=6) 9.60±6.06ng/mL and it was statistically significant. All these correlate with the literature studies.

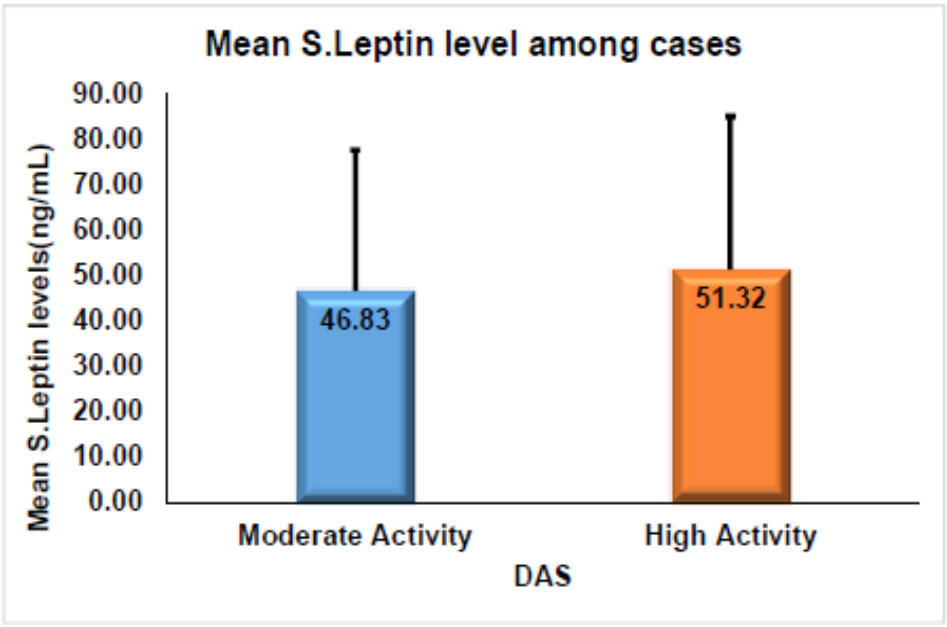


Fig-2: Comparison of Mean serum Leptin concentration in male and female RA patients with moderate and high disease activity

Figure.2 shows comparison of the mean serum Leptin concentration among the RA patients with moderate and high activity using unpaired student's t – test. Though the mean serum Leptin concentration in

high activity (n=26) was more (51.32 ± 33.81ng/mL) than that in moderate activity (n=34) (46.83±30.92ng/mL), the difference was not statistically significant [8].

Further in this study, the DAS showed no correlation with the S. Leptin, where the r value was 0.154 and it was not statistically significant [8].

CONCLUSION

From the above study we can come to an inference that

- Leptin has a major role in the pathogenesis of RA by its effect on both innate and adaptive immunity.
- Low S.Leptin levels, reflecting the reduced body fat mass, are associated with reduced disease activity.
- Therapeutic targets against Leptin signaling can impair the humoral and cellular immune responses on specific target tissues and could be a useful beneficial therapy in the near future.

REFERENCES

1. KELLEY'S Textbook of Rheumatology; Ninth edition; Part 9; Chapter 69; pg1059.
2. KELLEY'S Textbook of Rheumatology; Ninth edition; Part 9; Chapter 69; pg1063.
3. Trayhurn P, Wood IS. Signalling role of adipose tissue: adipokines and inflammation in obesity. BiochemSoc Trans 2005;33(Pt 5):1078–81.
4. Harald E. Vonkeman, Mart A.F.J.Van de Laar- the new EULAR/ ACR diagnostic criteria for Rheumatoid arthritis- curropin Rheumatol, 2013;25(3):354-359.
5. Fransen J, Stucki G, van Riel PL. Rheumatoid arthritis measures: Disease Activity Score (DAS), Disease Activity Score-28 (DAS28), Rapid Assessment of Disease Activity in Rheumatology (RADAR), and Rheumatoid Arthritis Disease Activity Index (RADAI). Arthritis Care & Research. 2003 Oct 15;49(S5).
6. Salazar-Páramo M, González-Ortiz M, González-López L, Sánchez-Ortiz A, Valera-González IC, Martínez-Abundis E, Balcázar-Muñoz BR, García-González A, Gámez-Nava JI. Serum leptin levels in patients with rheumatoid arthritis. JCR: Journal of Clinical Rheumatology. 2001 Feb 1;7(1):57-9.
7. Bado A, Levasseur S, Attoub S, Kermogant S, Laigneau JP. 1998. The stomach is a source of leptin. *Nature* 394:790–93
8. Anders HJ, Rihl M, Heufelder A, Loch O, Schattenkirchner M. Leptin serum levels are not correlated with disease activity in patients with rheumatoid arthritis. Metabolism. 1999 Jun 1;48(6):745-8.