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A STUDY OF INSULIN RESISTANCE IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

Rheumatology

Sreemanta Madhab Baruah Associate Professor, Department Of Medicine, Assam Medical College and Hospital, Dibrugarh, Assam, India.

John Kumar Das Senior Resident, Department of Clinical Immunology and Rheumatology, CMC Vellore.

Imdadul Hossain* Post Graduate Trainee, Assam Medical College and Hospital, Dibrugarh, Assam, India. *Corresponding Author

Sanjeeb kakati Professor, Department Of Medicine, Assam Medical College and Hospital, Dibrugarh, Assam, India.

ABSTRACT

Background Systemic lupus erythematosus (SLE) is the prototypic autoimmune chronic inflammatory disorder that predominantly affects women during their reproductive years and characterized by multisystem organ involvement and by high titres of auto-antibodies against several nuclear and cytoplasmic antigens. Increased risk of CHD in SLE is not explained by classic CHD risk factors.Insulin resistance and Metabolic syndrome are clearly strong candidates to justify the increase in CHD in patients with SLE and they provide insights into the pathogenesis of insulin resistance associated with inflammation. Insulin resistance is a key component of the World Health Organization–defined metabolic syndrome that is increased in patients with SLE. **Methods** The study was carried out in All SLE patients attending Rheumatology OPD and other outpatient department or in various ward of Department of medicine at Assam medical College and hospital satisfying the inclusion criteria.continuous variables were expressed as mean +-standard deviation.categorical variable were expressed as frequency and percentage.p value were considered statistically significant when it was less than 0.05 **Results** In our study ,the most common age group was found to be between 21-25 years(28%) followed by 16-20 years(20%).The female accounts for 96% and male accounts for 4%.From the study ,it was found that 47% of the study population had insulin resistance compared to 16% of that of healthy control.it indicates presence of significant insulin resistance in the study group (p value<0.05). The mean HOMA-IR score in the case was 3.54±3.41 and that in the control was 1.97±1.27. In the study conducted by C_intia N. H. Miyake et al , they found the similar result. The mean HOMA-IR score in the case and control were 1.85±1.68 and 1.40±0.86 respectively. (p value <0.05). Sanaa Gazareen et al study also showed significant insulin resistance in study group compared to control group. The mean HOMA-IR score in case was 1.5±0.86 and that in the control was 0.84±0.27.There was no significant difference in insulin resistance between male and female.There was no significant difference in insulin resistance between the newly diagnosed cases and the previously diagnosed cases who were on treatment.from the study it was also found that, as the disease activity increased,insulin resistance was also increased with co-relation coefficient(R) is 0.6053 and it was statistically significant (p value<0.05). **Conclusions** Systemic lupus erythematosus (SLE) is a chronic, multifaceted inflammatory disease that can attack every organ system of the body. As the overall prognosis for persons with SLE has improved in recent time due availability of medications but cardio-vascular morbidity or mortality has been increasing rapidly. In recent studies of SLE, we have seen a marked increase in the prevalence of the metabolic syndrome. Insulin resistance is a key component of the World Health Organization–defined metabolic syndrome that is increased in patients with SLE In this part of the country, 47% of the SLE cases were having insulin resistance compared to 16% of the healthy population (p value <0.05). There was no difference in insulin resistance in SLE cases who were newly diagnosed not on medication and the diagnosed cases those were on medication. Insulin resistance was significantly associated with disease activity. There was no co-relation of insulin resistance with disease duration. Fasting serum insulin level was significantly higher in SLE cases with insulin resistance compared to cases without insulin resistance. Though triglyceride level was significantly higher in SLE cases compared to healthy population but there was no difference in fasting lipid profile parameters in cases with insulin resistance and in cases without insulin resistance.

KEYWORDS

Systemic lupus erythematosus (SLE),disease activity ;insulin resistance

BACKGROUND

Systemic lupus erythematosus (SLE) is the prototypic autoimmune chronic inflammatory disorder that predominantly affects women during their reproductive years and characterized by multisystem organ involvement and by high titres of auto-antibodies against several nuclear and cytoplasmic antigens.

Etiology of SLE is still elusive. The disease expression is greatly influenced by the combined effect of genetic, environmental, demographic and geographical factors.

Increased risk of CHD in SLE is not explained by classic CHD risk factors.Insulin resistance and Metabolic syndrome are clearly strong candidates to justify the increase in CHD in patients with SLE and they provide insights into the pathogenesis of insulin resistance associated with inflammation. There are several mechanisms this could be explained such as obesity, inflammatory markers, medications to treat SLE patients.

Insulin resistance (IR) is a general phenomenon of many physiological states, disease states, and diseases. IR has been described in diabetes mellitus, obesity, infection, sepsis, trauma, painful states such as postoperative pain and migraine, schizophrenia, major depression, chronic mental stress, and others. In arthritis, abnormalities of glucose homeostasis were described in 1920; and in 1950 combined glucose and insulin tests unmistakably demonstrated IR. The phenomenon is now described in systemic lupus erythematosus, rheumatoid arthritis, ankylosing spondylitis, polymyalgia rheumatica, and others.

Inflammation in SLE leads to tissue injury, and thus increases reactive oxygen species and reactive nitrogen species and subsequent oxidative stress. Oxidants and oxidative stress may contribute to the pathogenesis of insulin resistance or vice versa. Insulin resistance (IR) is associated with a state of chronic low-grade inflammation, and several mediators released from various cell types, including immune cells and adipocytes, have been identified as being involved in the development of IR. Inflammation and IR are closely linked and inflammatory cytokines such as TNF, IL-6, IL-1, and IL-8 may inhibit insulin signaling by multiple mechanisms.

Atherosclerosis occurs prematurely in patients with SLE, independently of traditional risk factors for cardiovascular disease.This finding supports a role for disease-related factors in SLE patients' atherogenesis. In clinical practice, insulin resistance (IR) refers to a state in which a given concentration of insulin is associated with a subnormal glucose response. IR is likely the best predictor of type 2 diabetes mellitus and may, at least in part, be related to inflammatory substances secreted by adipocytes including leptin, adiponectin, tumour necrosis factor alpha, and resistin. For this reason, IR can promote the development of atherosclerosis not only through elevated glucose and insulin concentrations, but also via mechanisms that involve dyslipidaemia, hypertension, and inflammation.

Inflammation may worsen IR and impair pancreatic beta cell function. The metabolic changes that IR exerts may also contribute to the development of accelerated atherosclerosis and higher incidence of ischaemic heart disease found in patients with inflammatory and autoimmune diseases.

OBJECTIVES

1. To study insulin resistance in patients with systemic lupus erythematosus.
2. To study association of Insulin resistance with disease activity.

METHODS:

A hospital based cross-sectional study that was carried out in the Department of Medicine at Assam Medical College and Hospital, Dibrugarh from july 2017 to june 2018 .A total of 100 SLE patients fulfilling the inclusion and exclusion criteria were taken for the study.Disease activity was assessed using SLEDAI Score and the degree of insulin resistance was calculated by HOMEOSTASIS MODEL ASSESSMENT (HOMA) ,where insulin resistance (IR) is calculated by following formula-

$$\text{HOMA-IR} = \frac{\text{FASTING BLOOD GLUCOSE(mg/dl)} \times \text{FASTING INSULIN LEVEL}(\mu U/ml)}{405}$$

In our study,HOMA-IR score > 2.5 is taken as the cut off value for insulin resistance.For all analysis ,the statistical significance was fixed at 5% level of significance (p value <0.05).

We obtained a written informed consent from all study participants before enrolling them in the study

All SLE patients attending Rheumatology OPD and other outpatient departments or in various wards of department of Medicine at Assam Medical College and Hospital, who fulfilled SLICC criteria (2012) were taken up for the study.

Inclusion Criteria:

- All SLE patients attending Rheumatology OPD and other outpatient department or in various ward of Department of medicine at Assam medical College and hospital, who fulfill the SLICC (2012) criteria.
- Age 13 years and more.

Exclusion Criteria:

- Age less than 13 years.
- Pregnant women.
- Patients not giving consent.
- Diabetic patients

Statistical Analysis

Data was entered into computer Microsoft Excel and exported to Statistical Package for the Social Sciences (SPSS) version 20 for analysis. Continuous variables were expressed as mean ± standard deviation. Categorical variables were expressed as frequency and percentage. The chi-square test (for 2 x 2 tables) was used as test of significance for qualitative data. Pvalue was considered statistically significant when it was less than 0.05.

RESULTS

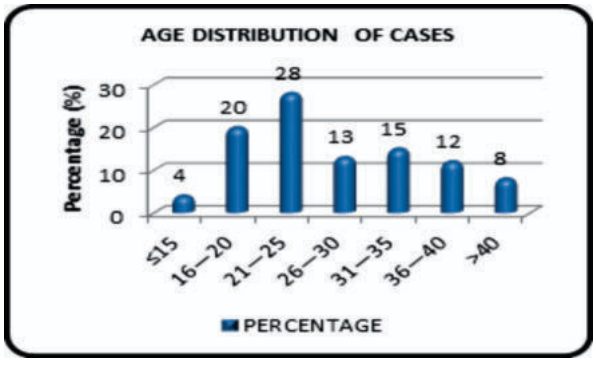


Fig 1.1: The most common age group was found to be between 21-25 years (28%) followed by 16-20 years (20%). The minimum age was 14 years and maximum age was 56 years. Mean age of patients in our study group was 27.50±9.33 years.

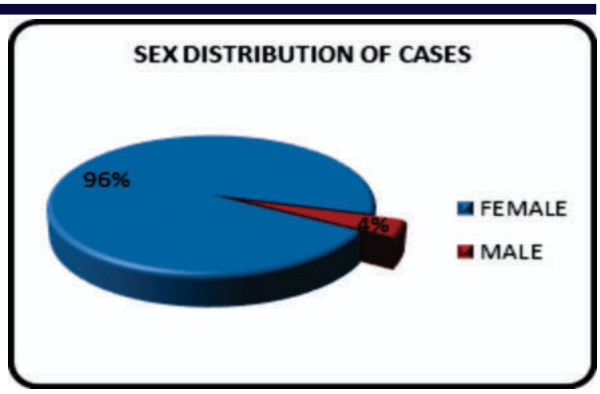


Fig 1.2: Among100 patients included in the study only 4 were male (4%) and rest 96 were female (96%). Female to Male ratio was 24:1

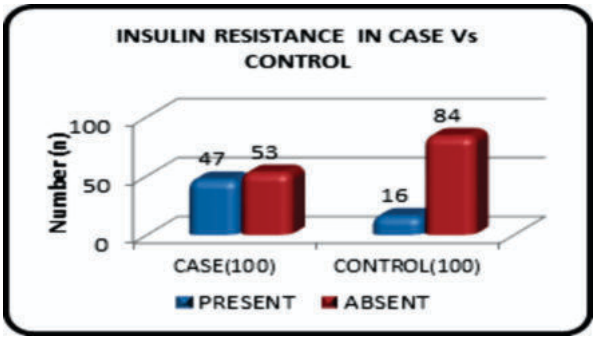


Fig 1.3: Out of 100 patients in group A, 47 were having insulin resistance and in group B, out of 100 healthy controls, 16 were having insulin resistance. It indicated presence of significant insulin resistance in group A (p-value<0.05).

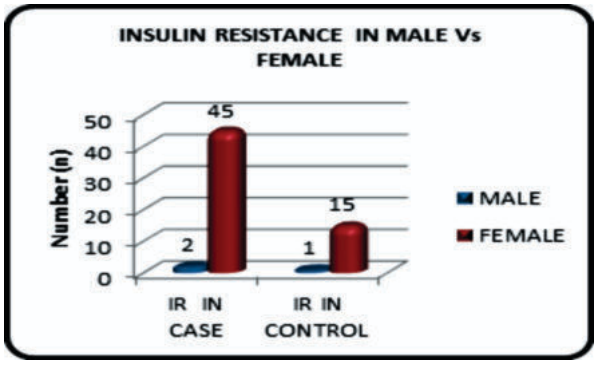


Fig 1.4: In group A, out 4 male patients, 2 had insulin resistance and amongst 96 female patients, 45 had insulin resistance. In group B, 1 in 4 male individuals and 15 in 96 female individuals had insulin resistance. The difference in male and female however in both the group was not significant

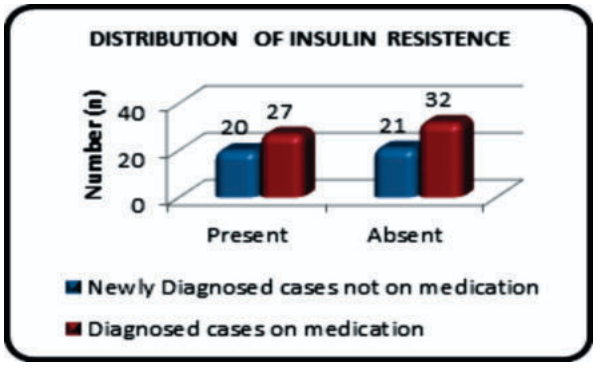
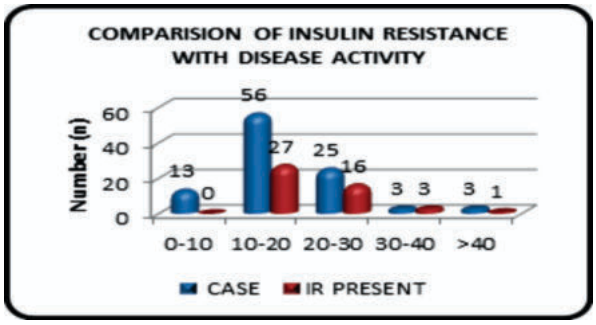


Fig 1.5: Out of 41 newly diagnosed cases who were not on medication, insulin resistance was present in 20 cases and of 59 diagnosed case who were on treatment, 27 had insulin resistance. This showed that there was no difference in insulin resistance between the two groups



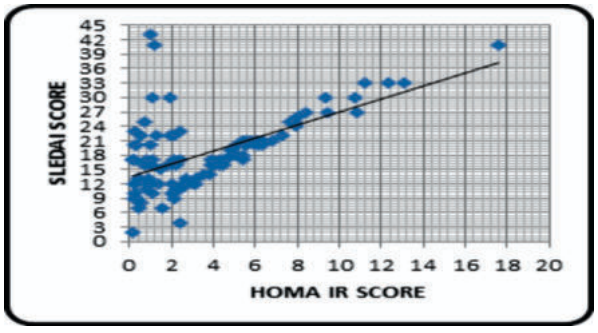


Fig 1.6: In CASEs, as the disease activity increased (calculated by SLEDAI SCORE) insulin resistance was also increased. The co-relation coefficient (R) was 0.6053 and it was statistically significant (p value <0.05)

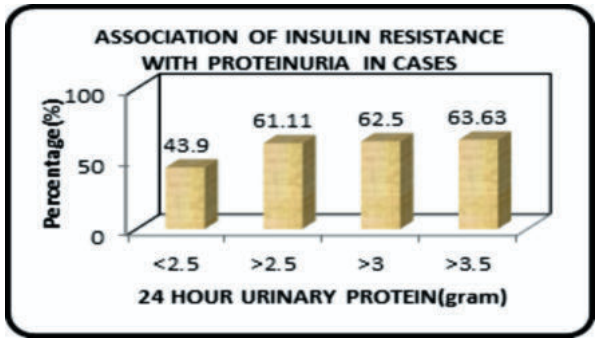


Fig 1.7: It was seen as the proteinuria was increased, percentage of cases with insulin resistance was also increased though it was not statistically significant

DISCUSSION:

Various studies have shown association of insulin resistance with SLE and disease activity. . In our study,the most common age group was found to be between 21–25 years (28%) followed by 16-20 years (20%). A similar type of age distribution was found in study conducted by Balachandra S. Bhat et al (2015) in India. Among the 100 patients included in the study only 4 were male (4%) and rest 96 were female (96%). Female to Male ratio was 24:1. In our study, 47% of the study population had insulin resistance compared to 16% of that of healthy control. It indicates presence of significant insulin resistance in the study group (p-value<0.05).which is consistent with the study conducted by C_intia N. H. Miyake et al (6). Our study showed that in study group, as the disease activity increased (calculated by SLEDAI SCORE) insulin resistance was also increased. The co-relation coefficient (R) is 0.6053 and it was statistically significant (p value <0.05). Sanaa Gazareen et al Conducted study also found a positive co-relation between disease activity (SLAM score) and insulin resistance.

CONCLUSION:

As the overall prognosis for persons with SLE has improved in recent time due availability of medications but cardio-vascular morbidity or mortality has been increasing rapidly. In recent studies of SLE, we have seen a marked increase in the prevalence of the metabolic syndrome. Insulin resistance is a key component of the World Health Organization–defined metabolic syndrome that is increased in patients with SLE. In our study it was found that there is increase insulin resistance among SLE patients compared to healthy individuals and Insulin resistance was significantly associated with disease activity.

Thus Routine inclusion of simple indices of insulin resistance in SLE patients is strongly suggested as well as non-pharmacological and pharmacological measures when necessary to improve insulin sensitivity.

REFERENCES

1 JC O. The biology of reactive intermediates in systemic lupus erythematosus.. Autoimmunity. 2010; 43(56-63).
2. Roman MJ SBDALMSLea. Prevalance and correlates of accelerated atherosclerosis in SLE. N Engl J Med. 2003; 349(2399-2406).
3. ASANUMA Y OASAea. Premature coronary-artery atherosclerosis in SLE. N eng J of med. 2003; 349(2407-15).
4. al pme. Derivation and validation of the Systemic Lupus International Collaborating Clinics classification criteria for systemic lupus erythematosus. arthritis rheum. 2012 aug; 64(8)(2677-86).
5. Sanaa Gazareena DFMENADea. Study of insulin resistance in patients with systemic lupus erythematosus and rheumatoid arthritis. Menoufia Med J. 2014; 27(215-25).
6. al CNHMe. Increased Insulin Resistance and Glucagon Levels in Mild/Inactive Systemic Lupus Erythematosus Patients Despite Normal glucose tolerance. Arthritis Care & Research. 2018 jan; 70(1)(114-24).
7. Chung CP AIOAGTSARPea. High frequency of the metabolic syndrome in patients with systemic lupus erythematosus: association with disease characteristics and cardiovascular risk factors.. ann rheum dis. 2007; 66(208-14).
8. Hunter SJ GW. Insulin action and insulin resistance:diseases involving defects in insulin receptors, signal transduction. Am J Med. 1998; 105(331-45).
9. Sasaoka T IMSTea. Comparison of the insulin and insulin-like growth factor 1 mitogenic intracellular signaling pathways. Endocrinology.1996; 137(4427-34).
10. Haffner SM MLFABJSM. Insulin resistant prediabetic subjects have more atherogenic risk. Circulation. 2000; 101(975-980).