Lupus Nephritis and Oxidative Stress

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Summary

Reactive oxygen species play an important role in the pathogenesis of different glomerulopathies. The purpose of this study was to examine selected markers of oxidative stress and antioxidant defense in lupus nephritis. Therefore, this study was carried out to investigate oxidant and antioxidant status in lupus nephitis patients. The blood samples were analyzed for quantitation of malondialdehyde as index of lipid peroxide, vitamin C, total antioxidant capacity. Significantly increased levels of serum lipid peroxide and decreased levels of serum total antioxidant capacity and plasma vitamin C were noticed in the patients with lupus nephritis as compared to control subjects.

Key words:-Malondialdehyde (MDA), Total antioxidant capacity (TAC), vitamin C (vit C), Lupus nephritis (LN).

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Introduction

The renal involvement is a major complication of systemic lupus erythematosus and occurs in 30-70% with SLE. Lupus nephritis is classified into six classes (I-VI) by the international Society of Nephropathy and Renal Pathology Society (ISN/RPS). Although NS is commonly associated with diffuse (ISN/RPS classIV) or membranous (ISN/RPS classV) lupus nephritis. Several reports have described NS in adult patients with minimal mesangial lupus nephritis (ISN/RPS classI) or mesangial proliferative lupus nephritis (ISN/RPS classII).[1] Oxidative stress can be correlate with glomerular injury.[2] Increase oxidative stress is a hallmark of autoimmune disease of lupus nephritis.[3] Lupus nephritis is characterized by increased expression of oxidative markers.[4] Membranous lupus nephritis with nephrotic syndrome remains controversial. While the risk of progressive renal deterioration may be small, persistent heavy proteinuria leads to the complications of oedema, hypoalbuminemia, hyprlipidemia, hypercoagulability and venous thrombosis.[5] LN patients with the abnormal tubular study results more often present with nephritis or nephritic sediment and peripheral edema.[6, 7] The lupus nephritis are classified according to WHO classification and are correlate with response to therapy and prognosis.[8]

The objective of this study was to investigate possible associations between oxidative stress and the severity of lupus nephritis with the estimation of the serum TAC, MDA, plasma ascorbic acid (vit C) and correlate with severity of lupus nephritis and other complications of LN.

Materials and Methods

The present study was conducted at the Department of Biochemistry S.S.Medical college Rewa (M.P.) with collaboration of Department of Biochemistry N.S.C.B.Medical college Jabalpur (M.P.).

The study group:-The present study was case control study conducted on 2 groups. Each group based on 50 individuals.

Group I:-Comprised of control.

Group II:-Comprised with adult LN patients.

Age of the patients group I & II ranged from 30 to 80 years, patients were from same geographical area and none was taking a special diet, untreated LN patients newly diagnosed by biopsies evidences of nephritis. Group Ist was judged to be free of any illness by clinical examination, LN patients were not with any other active complication medical condition or with systemic diseases. Fasting venous blood were drawn from all. Total antioxidant capacity (TAC) in serum was estimated by using spectrophotometric method described by D-Koracevic et al.[9] Malondialdehyde (MDA) one of the aldehydic by product of lipid peroxidation in serum was estimated by its thiobarbituric acid reactivity, spectrophotometric method described by Hunter et al.[10] Plasma ascorbic acid (Vit C) was measured by colorimetric method described by Roe and Kuether et al.[11] The study protocol was approved by the ethics committee of the Devi Ahilya Vishvavidyalaya of M.G.M.Medical College. The mean and standard deviation were determined for each variable in all groups. All the results were expressed as mean +/-SD. Student "t" test was used to assess statistical significance of the results between group I and group II.

Results

All results of group II were compared with group I. The level of all biochemical parameters were significantly changed between groups I and II. Descriptive statics of diagnostic parameters in group I & group II presented in Table I. There was a statistically significant decreased level of the serum TAC, plasma vit C level and increased serum MDA, level in group II when compared to group I.

Table I- Comparison of diagnosed biochemical parameters between control (group I) and patients (group II) with LN

Parameters	Group I	Group II
n	50	50
TAC(mmol/l)	1.68 ± 0.12	0.62 ± 0.02*
MDA(nmol/ml)	0.44 ± 0.14	6.53 ± 2.9*
Vit C(mg/dl)	1.11 ± 0.25	0.33 ± 0.03*
p value		*group I compare to group II * $p<0.001$

(n=No. of subjects and patients)

All results expressed in mean and standard deviation (SD).

Discussion

In the present study represent that LN patients have more severe oxidative stress than normal persons where oxidative stress may play an important intermediary role in the pathogenesis of lupus nephritis.

In general patients with systemic lupus erythematosus (particularly with lupus nephritis and cardiovascular diseases) had more oxidized epitopes on LDL compared with controls. Furthermore anticardiolipin antibodies in these patients recognized epitopes generated during lipid peroxidation. Increased oxidative stress are present in systemic lupus erythematosus and may be of importance for the development of renal diseases premature cadiovascular diseases and possibly also for other autoimmune phenomena observed in systemic lupus erythematosus.[12]

The degree of lipid peroxidation seemed to be correlated with the extent of proteinuria in lupus nephritis. As compared with the normal values the activity of the three enzymes superoxide dismutase, catalase, glutathione peroxidase were decreased and did not correlate with the level of proteinuria.[13] Early atherosclerosis risk factor in patients with systemic lupus erythematosus in respect to the presence of lupus nephritis and antiphospholipid antibodies.[14] Intravenous immunoglobulin might be effective in treatment resistant membranous or membranoproliferative lupus nephritis.[15]

Intensive immunosuppression with steroids and antioxidant supplements for oxidative stress can achieve excellent long term results in the treatment of systemic lupus with lupus nephritis.

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