

# Evaluation of Serum Oxidized Ldl in Hemodialysis Patients as A Riskfactor for Atherosclerosis

Sadia Rehman

Bahria University of Health Sciences

## ABSTRACT

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### Objective:

- To evaluate the ox-LDL levels in hemodialysis patients.
- To evaluate the LDL and ox-LDL levels in hemodialysis patients.
- To determine if ox-LDL is associated with atherosclerosis in hemodialysis patients.

**Introduction:** Patients receiving hemodialysis have a significant risk of death and cardiovascular problems. In addition to conventional risk variables, higher mortality and excessive oxidative stress emerge as unique and significant contributors to accelerated atherosclerosis.<sup>1,2</sup> Up to 60% of mortality in dialysis patients is caused by atherosclerotic vascular disease, which is widespread in patients with chronic renal failure. However, standard lipid risk factors like LDL cholesterol do not entirely explain the higher mortality.<sup>3,4</sup> Little attention has been paid to the function of oxidized-LDL in the development and treatment of oxidative stress-induced cardiovascular illnesses in hemodialysis patients, despite advancements in medicine and biochemistry.<sup>5,6</sup> This study's objectives were to determine the Ox-LDL levels in hemodialysis patients with chronic renal failure and evaluate its value as a marker for atherosclerosis. This study will assist nephrologists in identifying and treating atherosclerotic alterations in individuals receiving hemodialysis early, which will reduce morbidity and death in these patients.

**Materials And Methods:** The suggested study was a prospective, hospital-based case-control investigation. The study was conducted in conjunction with the JPMC Karachi departments of radiology and nephrology at the Department of Biochemistry BMSI. The study was carried out between January 2018 and January 2019. A sample size of 90 individuals was determined, and these participants will be split into the following three groups: Group A consisted of 30 healthy control participants, Group B was composed up of 30 patients who received hemodialysis for a maximum of three years, while Group C was composed of 30 participants who received hemodialysis for a longer period of time. While the controls were recruited from the general community of healthy individuals, the hemodialysis patients were chosen from the dialysis center. The patients who were being studied underwent maintenance hemodialysis three times per week. Both the research subjects and the control group had their common carotid artery's intima media thickness (IMT) ratio measured using Doppler ultrasonography. Oxidized LDL (ox-LDL) values in the serum were used to identify lipid peroxidation. The current study was given ethical approval by the JPMC, Karachi dairy no: NO.F.2-81-IRB/2018-GENL/5173/JPMC. Data were entered into SPSS, and the proper statistical analysis were done in accordance. The IBM statistics program for social sciences was used to conduct the statistical analysis.

**Selection Of Subjects:** 90 people over the age of 18 were chosen for the study based on inclusion and exclusion criteria. The respondents were thoroughly questioned about their background, medical history, and general and surgical conditions. Information was also gathered about the individuals' age, gender, length of hemodialysis, and medication use. We also recorded the patient's height, weight, BMI, blood pressure (BP), pulse, temperature, and breathing rate. Every subject provided their verbal and written agreement in English and Urdu, fully signed or thumbprinted. All participants were included in accordance with the

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inclusion and exclusion criteria. Men and women between the ages of 18 and 50 who had had dialysis for more than two months and who weren't taking any supplemental antioxidants were included in the study. Patients with any other chronic condition, such as tuberculosis or cancer, those receiving hemodialysis for acute renal failure, and anybody unwilling to participate in the trial were all excluded from the study.

**Results:** Between the patients and controls, there was a very significant difference in mean systolic blood pressure, mean BMI, mean plasma superoxide dismutase, and mean serum malondialdehyde (p value < 0.001). Ox-LDL and serum malondialdehyde showed a high linear positive connection ( $r = 0.4$ ), but ox-LDL and plasma superoxide dismutase showed a strong linear negative correlation ( $r = -0.73$ ). In group A samples, the mean intima thickness was  $0.43 \pm 0.02$  mm, but in group C samples, it was  $1.0 \pm 0.09$  mm. OX-LDL and MDA levels were significantly higher in group C compared to groups A and B, SOD levels were significantly higher in group In comparison to group B and group C samples, TG levels were substantially greater in group C than in groups A and B. Group A had significantly higher LDL than group B, while group B had much higher LDL than group C. Group A also had significantly higher blood HDL than group C. Group B had much greater cholesterol than groups A and C. In comparison to groups B and C, HDL levels in group A were considerably greater.

**Conclusions:** The ratio of carotid artery intima media thickness, a hallmark of the beginning of atherosclerosis, rises in patients receiving maintenance hemodialysis because they have much higher levels of lipid peroxidation and oxidative stress. The results of this study will assist nephrologists in identifying the variables that cause atherosclerosis to occur in hemodialysis patients with high lipid peroxidation.

**Keywords:** Ox-LDL, hemodialysis, malondialdehyde superoxide dismutase, lipid peroxidation

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