RELATIONSHIP BETWEEN PLASMA YKL-40 LEVELS AND ENDOTHELIAL DYSFUNCTION IN CHRONIC KIDNEY DISEASE

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INTRODUCTION AND AIMS

As well as standard cardiovascular risk factors, non-conventional risk factors such as endothelial dysfunction, oxidative stress and insulin resistance have crucial role for progression of chronic kidney disease and cardiovascular disease. YKL-40 is a 38-kDa secrated inflammatory glycoprotein and it belongs to chitinase gene family. The serum levels of YKL-40 have increase in case of acute and chronic inflammation and YKL-40 takes part in endothelial dysfunction and inflammation in chronic kidney disease.

METHODS

This study includes 29 hemodialysis patients. 101 chronic kidney disease patients and 38 individuals as a healthy control group. Routine blood parameters and YKL-40 levels were measured. Endothelial dysfunction was indirectly calculated by assessing Flow-mediated dilatation (FMD) in brachial artery. FMD (%) was calculated by: (diameter of post brachial artery hyperemic current- diameter of basal brachial artery x 100/ diameter of basal brachial artery) formula.

RESULTS

No meaningful differences were noticed in terms of age, sex, smoking habit between groups(p>0.05). Chronic kidney disease(CKD) group and hemodialysis (HD) group were similar in terms of accompanying diseases (Diabetes, hypertension, cardiovascular disease) (p>0.05). YKL-40 levels were noticed to be meaningfully low in control group (31.73±21.12 ng/ml) compared to both CKD (55.98±22.96 ng/ml) and HD (83.91±16.88 ng/ml) groups (p>0.001). Percentages of FMD measured as a marker for endothelial dysfunction were 13.24±6.34% in control group, 4.82±3.79% in CKD group and 2.97±2.73% in HD group. FMD values were found to be meaningfully low in HD group compared to other groups (p=0.015). There was strong negative correlation between YKL-40 and MDRD calculated glomerular filtration rate (GFR) (r=-0.674, p<0.001). Moreover, YKL-40 levels negatively correlated with FMD, albumin, hemoglobin and HDL cholesterol levels. While YKL-40 level increases FMD percentage decreases significantly (r=-0.471, p<0.001). YKL-40 levels were shown to be in positive correlation with CRP, uric acid and triglyceride levels. A weak positive correlation with age was also noticed.

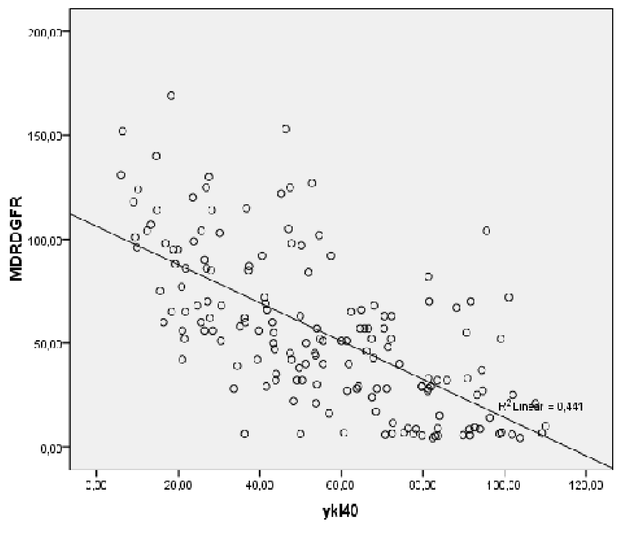

Figure 1: Correlation between YKL-40 and glomerular filtration rate (according to MDRD formula) in all patients (p<0,001, r=-0,674)

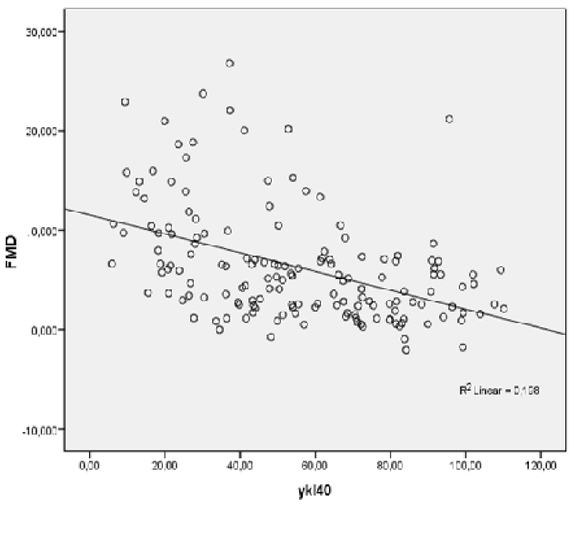

Figure 2: Correlation between YKL-40 and FMD in patients with all CKD patients (p<0,001, r=-0,471

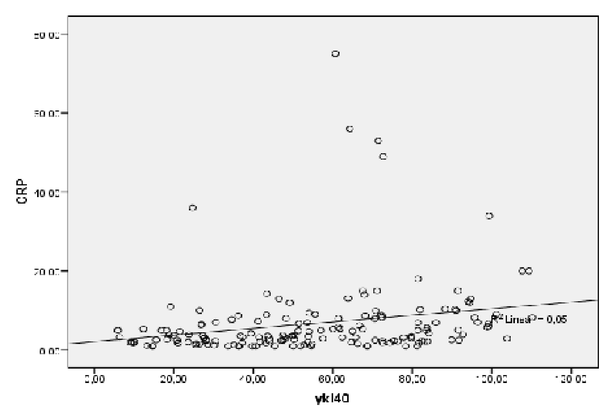

Figure 3: The serum YKL-40 levels are correlated with serum CRP levels (p<0,001, r=0,358)

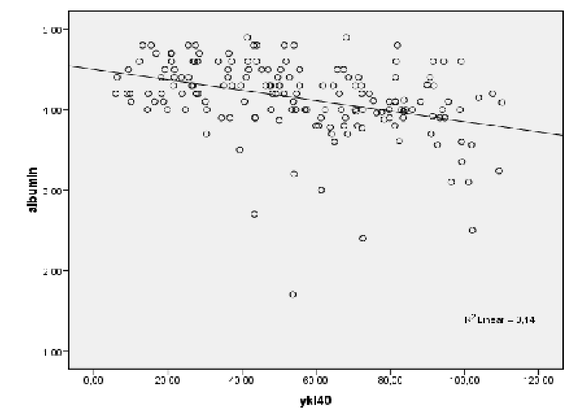

Figure 4: The serum YKL-40 levels are negatively correlated with serum albumin levels (p<0,001, r=-0,429)

CONCLUSION

In this study, we aimed to assess YKL-40 serum levels and correlate them with kidney functions, inflammatory parameters like CRP, albumin and FMD as a marker of endothelial function and compare CKD patients and healthy subjects. We revealed negative correlation between YKL-40 and kidney function measured by GFR. YKL-40 levels seemed to be increasing with decreasing kidney functions. We also found YKL-40 levels are negatively correlated with FMD measurements and albumin; but positively correlated with CRP levels and other inflammatory markers. Endothelial function assessed by FMD is impaired in CKD patients. Degree of impairment also correlates with extent of atherosclerotic disease. Serum YKL-40 levels correlated negatively with FMD. YKL-40 may also contribute to endothelial dysfunction and enhanced risk of cardiovascular complications in CKD patients. We owe this mainly to impaired renal function and ongoing subclinical inflammation in these patients.
We believe that YKL-40 is a considerable marker to asses both endothelial dysfunction and proinflamtory process in CKD.

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