

Highly Electronegative Low-density Lipoprotein Is a Novel Factor for Endothelial Dysfunction and Coronary Artery Disease in Hemodialysis Patients

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Objectives:

Abnormal lipid metabolism has been shown as a risk factor of cardiovascular disease in patients with metabolic syndrome, but its role in the development of CAD among end stage renal disease patients remains controversial. L5 is the most electronegative and atherogenic subfraction of low-density lipoprotein (LDL) and has been known to be a risk factor of CAD in patients with diabetes, hyperlipidemia, metabolic syndrome, or smokers. The effects of L5 on hemodialysis patients have not been explored.

The aim of the study was to find the association of L5 on CAD risk and the possible pathogenic mechanism

Methods:

Fasting venous blood was taken from 39 hemodialysis patients and 21 healthy control participants.

LDL isolated by ultracentrifuge was subjected to a fast protein liquid chromatography machine charged with an anion-exchange column.

Five LDL subfractions were eluted- L1, L2, L3, L4 and L5 with increasing electronegativity.

We examined and compared the level and composition of L5 between hemodialysis patients and control subjects.

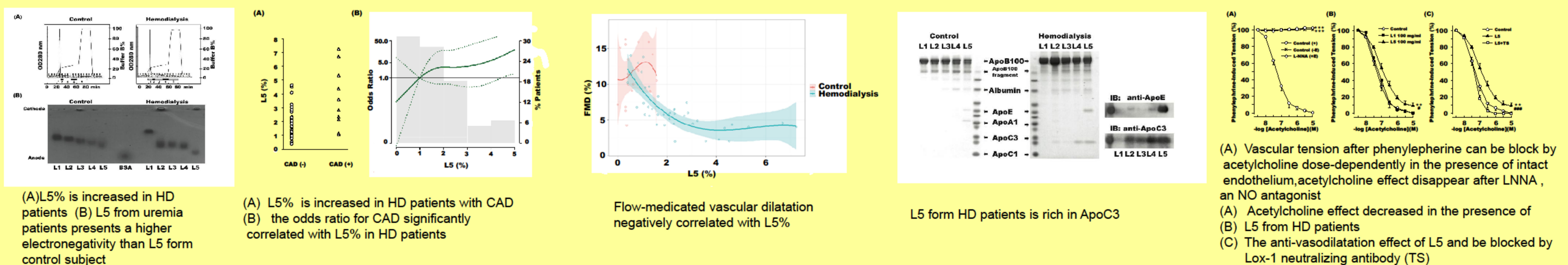
L5 was incubated with cultured rat aortic ring to exam L5 effects on vascular tension.

The L5 effects on human aortic endothelial cells apoptosis and potential signal transduction pathway were also tested.

Flow-mediated vascular dilatation (FMD) was done in all the study subjects.

The percentage of L5 (L5%) on the LDL was used as a parameter for further clinical study analysis

Results:



Conclusions:

Our findings suggest that the elevated level of L5, which is highly electronegative and rich in ApoC3.

ApoC3 rich lipoprotein has been known to be a risk factor of CAD.

L5 can block NO formation via LOX-1 mediated pathway.

L5 may play an important role in the pathogenesis of atherosclerosis

In hemodialysis patients and may account for the development of coronary artery disease in this patient population.

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