Lower serum high-density lipoprotein-cholesterol level is associated with the new-onset of peripheral arterial disease in non-diabetic hemodialysis patients.

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Introduction and objectives

Proportion of comorbid peripheral arterial disease (PAD) in hemodialysis(HD) patients in Japan is 11.5%. [1)]
PAD affects prognosis including quality of life in HD patients. [1)]
Some studies have demonstrated inverse correlation between the serum level of high-density lipoprotein-cholesterol (sHDL-C) and the risk of new-onset peripheral artery disease (PAD) in general population. [2) 3)]
However, little is known regarding this relationship in HD patients.
The aim of this study was to evaluate the association between sHDL-C with the new-onset of PAD in non-diabetic HD patients.

METHODS

We prospectively observed consecutive 105 non-diabetic HD patients diagnosed without PAD at baseline in a single center in Japan for five years.
Diagnosis of PAD was defined as the significant lower limb arterial stenosis (60% and more) using ultrasonography at baseline and five years later.
We set new-onset of PAD diagnosed by ultrasonography as the main outcome measure in this investigation.
Main exposure to be tested was sHDL-C at baseline: sHDL-C greater or equal 40mg/dL(the Japanese guideline cut-off level) was defined as reference.
Logistic regression analysis was employed to estimate the odds ratio (OR) and 95% confidence interval (CI) of newly PAD onset by sHDL-C at baseline.
Multivariate analyses were adjusted for age, gender, smoking, and statin use.

RESULTS

Table 1
Association between PAD and sHDL-C

		PAD	no PAD	Total
sHDL＜40		13	22	35
sHDL≧40		8	62	70
	Total	21	84	105

The number of new-onset PAD were 13/35 cases (37.1%) and 8/70 cases (11.4%) in low-sHDL-C (less than 40mg/dL) group and high-sHDL-C (greater or equal 40mg/dL), respectively.

Table 2
Baseline characteristics of patients with low and normal sHDL-C

	HDL<40 (N=35)	HDL≧40 (N=70)	*p* value
Age (yaers)	62.7±12.4	54.4±11.6	<0.001
Sex (M/F)	16/19	42/28	0.212
Vintage (years)	12.3±7.3	12.8±8.5	0.762
Smoking(%)	48.6	54.3	0.780
Hypertention (%)	68.6	57.1	0.294
Calcium (mg/dl)	9.3±0.6	9.4±0.7	0.741
Phosphorus (mg/dl)	5.3±1.3	5.3±1.1	0.971
intact-PTH (pg/ml)	278.2±246.5	225.9±208.3	0.261
CRP (mg/dl)	0.3±0.2	0.2±0.3	0.143
Statins (%)	16.70	10.37	0.351

Table 3
Significant association with low sHDL-C and new-onset PAD (multivariate Logistic regression analysis)

		OR	95%CI	*p* value
Model 1	crude	2.140	1.306—3.608	<0.001
Model 2	Model 1+Age,Sex	1.753	1.022—3.048	0.0417
Model 3	Model 2+Smoking	1.766	1.028—3.078	0.0401
Model 4	Model 3+Statin	1.767	1.028—3.085	0.0401

Summary

- We analysed the association between sHDL-C with the new-onset of PAD in non-diabetic HD patients.
- The number of new-onset PAD were 12/34 cases (35.3%) and 6/77 cases (7.8%) in low-sHDL-C (less than 40mg/dL) group and high-sHDL-C(greater or equal 40mg/dL), respectively. Multivariate logistic regression analyses revealed that lower sHDL-C was significantly related with greater odds of new-onset PAD (OR 2.1, 95%CI 1.1 to 4.0, p=0.03).

Discussion

Strength
- In HD patients, few studies indicate that the inverse relationship between sHDL-C and the proportion of PAD.
- Our investigation suggest that the association between low sHDL-C with new-onset PAD in the longitudinal observation with adjustment for some confounding factors.
- Most previous studies used ABI for diagnosis of PAD, but lower limb arterial ultrasonography has higher sensitivity in HD patients. [4) 5) 6)]

Limitation
- We have to consider selection bias in a single center setting such as ours to some extent.
- It is also recognized that the nature of an observational study that the association being observed may suffer from confounding factors not measured and that cannot infer causality.

CONCLUSIONS

These results suggests that lower sHDL-C is associated with new-onset PAD in non-diabetic HD patients.

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