

LETTER TO THE EDITOR

Investigation of Correlation between HDL and Mean Platelet Volume in Patients Having Small Dense LDL Values

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Platelets are the major effector components in thrombosis, which can disrupt normal blood flow [1,2]. Excessive platelet aggregation can lead to thrombotic events [3]. Pro-atherogenic lipoproteins such as low-density lipoprotein (LDL) are related with an increased thrombotic susceptibility [4]. In contrast, high-density lipoprotein (HDL) is known to decrease the risk of thrombosis [1-2,5]. HDL shows inverse correlations with incidence of atherosclerotic cardiovascular disease [2]. Mean platelet volume (MPV) is one of platelet indexes produced by an automatic hematologic analyzer. It represents the mean value of platelet size. Larger platelets are more active and may have thrombotic characteristics [6]. In this study, we analyzed the relationships between MPV and various lipoprotein particles such as LDL, HDL, and small dense LDL (sdLDL). MPV was measured using an ADVIA 2120 (Siemens Healthcare Diagnostics, Tarrytown, NY, USA) within 2 hours of venous sampling. LDL and HDL were analyzed in AU 5800 (Beckman Coulter, Brea, CA, USA). The sdLDL was tested on the Lipoprint LDL system (Quantimetrix, Redondo Beach, CA, USA) by electrophoresis method. Patient data were retrospectively collected in electronic medical records. Total 143 individuals were randomly selected from a medical check-up group as a control group which was used in our previous studies. As a patient group, a total of 200 patients were enrolled and all of them had sdLDL results (Table 1).

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Table 1. Patients' characteristics in this study.

Characteristics	Values
Gender (m/f)	113/87
Age (years)	65.32 ± 12.15
WBC (10 ³ /μL)	6.83 ± 2.54
Hemoglobin (g/dL)	13.44 ± 1.80
Hematocrit (%)	40.22 ± 5.14
Platelet count (10 ³ /μL)	229.47 ± 71.48
MPV (fL)	8.28 ± 0.88
HDL (mg/dL)	46.11 ± 12.02
LDL (mg/dL)	85.58 ± 40.00
sdLDL (mg/dL)	4.83 ± 4.95
Total Cholesterol (mg/dL)	157.28 ± 47.43
Triglyceride (mg/dL)	143.63 ± 127.30
Troponin (mg/dL)	234.09 ± 1,281.00
CRP (mg/dL)	3.26 ± 6.16
hsCRP (mg/dL)	0.47 ± 2.24
Glucose (mg/dL)	124.02 ± 39.69
Coronary artery disease	152
Hypertension	133
Dyslipidemia	131
Diabetes Mellitus	85
Cerebrovascular disease	56

Values are mean ± standard deviation.

m - male, f - female, WBC - white blood cell, MPV - mean platelet volume, HDL - high-density lipoprotein, LDL - low-density lipoprotein, sdLDL - small dense low-density lipoprotein, CRP - C-reactive protein, hsCRP - high-sensitivity CRP.

The mean MPV was 8.2750 fL in the patient group and 7.9594 fL in the control group ($p = 0.0001$). Among 3 sub-patient groups according to the sdLDL values such as normal, intermediate, and abnormal, there was no statistical difference in MPV. Both LDL and sdLDL presented no significant relationships with MPV in the patient group. However, in contrast with these results, HDL shows the statistically significant negative correlation with MPV ($p = 0.008$) (Figure 1).

HDL is known to be an important protective factor of platelet-dependent thrombus formation [2,7]. According to the recent studies, this effect of HDL includes receptor-mediated modulation of platelet activity [2,8-10]. In our study, higher HDL presents the negative significant relationships with the platelet size represented as lower MPV. These findings are the first report showing that HDL modulates platelet function by changing platelet index. Because platelet with lower MPV has smaller size and lower activity than higher MPV, the negative correlations between HDL and MPV is compatible with previous studies reporting the inhibiting role of HDL on

platelet activity [1,6]. In the future, as an indicator of platelet size and activity, MPV should be analyzed thoroughly to investigate a decrease in MPV by increasing HDL can prevent or stabilize the thrombotic events.

Ethical Approval:

This study was approved by the institutional review board of Kyung Hee University Hospital (No. 2022-07-045) and the requirement for informed consent was waived.

Sours of Funds:

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Declaration of Interest:

The authors declared that there were no conflicts of interest that could influence the study.

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Correlation between MPV and Lipoproteins

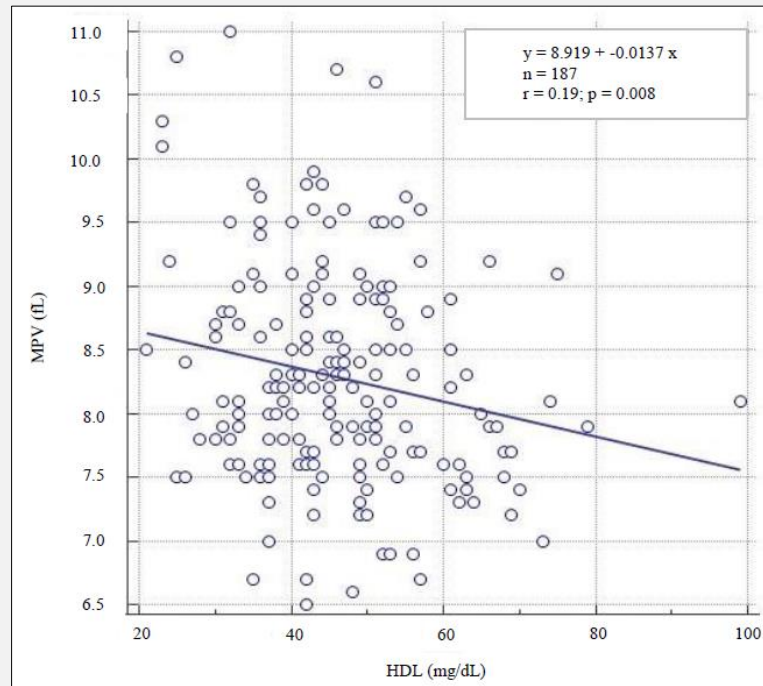


Figure 1. The strong negative correlation between MPV and HDL.

HDL demonstrates a statistically significant inverse correlation with MPV ($p = 0.008$).
MPV - mean platelet volume, HDL - high-density lipoprotein.