Small Dense LDL Cholesterol Predicts Incident Diabetes Mellitus: The Atherosclerosis Risk in Communities Study

Yashashwi Pokharel, Wensheng Sun, Salim S Virani, Christie M Ballantyne, Ron C Hoogeveen, Baylor Coll of Med, Houston, TX

**Background**- Small dense low-density lipoprotein cholesterol (sd-LDL-C) is an independent predictor of vascular events even in individuals with lower levels of LDL-C. Diabetics in particular tend to have higher levels of sd-LDL-C compared to those without diabetes. It is not known if sd-LDL-C predicts incident diabetes mellitus (DM).

**Objectives**- We tested the hypothesis that elevated levels of sd-LDL-C measured using a new automated assay predict incident DM in the biracial ARIC study.

**Methods**- Plasma sd-LDL-C was measured in 9,451 men and women without prevalent DM using a newly developed automated homogeneous assay. A Cox proportional hazards model was used to examine the association of sd-LDL-C with risk for incident DM.

**Results**- More individuals in the highest vs. lowest sd-LDL-C quartiles were men, Caucasians, had hypertension and higher mean body mass index (BMI) (P<0.001 for all comparisons). Similarly more individuals in the highest vs. lowest sd-LDL-C quartiles had parental history of DM (31.2 vs. 28.8%, P=0.012) and higher mean fasting blood glucose (116 vs. 102 mg/dL, P<0.001). Over a period of 10.4 years 911 individuals developed new onset DM at a rate of 9.27 per thousand person years. In a fully adjusted model, individuals in highest vs. lowest sd-LDL-C quartiles have a 44% increased risk for the development of incident DM even after adjusting for fasting blood glucose (Table).

**Conclusion**- sd-LDL-C predicts incident DM in the biracial ARIC study.

| Hazard Ratio (95% CI) for Incident Diabetes Mellitus by sd-LDL-C Quartiles
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<td>Model 1†</td>
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*Least square 1 is reference,
†Adjusted for age, gender, and race.
‡Model 1 + BMI, hypertension, waist circumference, current smoking, and parental history of DM.
§Model 2 + fasting blood glucose

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