

Nonlinear Dose-response Association of Remnant Cholesterol With MACCE After PCI in Acute Myocardial Infarction

Jiali Su, Xiang Zhu, Lei Wu*

School of Public Health, Nanchang University, Nanchang, China

Email address:

leiwu@ncu.edu.cn (Lei Wu)

*Corresponding author

Abstract

Background: Remnant cholesterol (RC) has emerged as a potential contributor to residual cardiovascular risk, but its nonlinear dose-response association with adverse outcomes after percutaneous coronary intervention (PCI) in patients with acute myocardial infarction (AMI) remains incompletely characterized. **Objective:** This study aimed to evaluate the association between RC and the risk of major adverse cardiovascular and cerebrovascular events (MACCE) after PCI in patients with AMI. **Methods:** This multicenter ambispective cohort study consecutively enrolled 4,440 patients with AMI from 3 provincial tertiary hospitals in Jiangxi Province between January 2018 and December 2020. The primary outcome was post-PCI MACCE. Restricted cubic spline (RCS) models within the Cox proportional hazards regression framework were fitted with 4 knots at the 5th, 35th, 65th, and 95th percentiles of the RC distribution to evaluate the dose-response association between RC and MACCE. **Results:** The median follow-up was 1,389.00 days (IQR: 1,083.75-1,754.00). The median age at baseline was 65.00 years (IQR: 57.00-72.00), 74.55% of patients were men, and the incidence of MACCE was 25.99%. After adjustment for potential confounders, RC was positively and nonlinearly associated with MACCE risk ($P_{\text{Total}} = 0.013$; $P_{\text{Nonlinear}} = 0.037$). The fitted curve showed a J-shaped pattern with a threshold-like change around $RC = 0.49$ mmol/L and a progressive increase in risk at higher RC levels. In subgroup analyses, RC was not significantly associated with MACCE among patients aged <55 years ($P_{\text{Total}} = 0.264$; $P_{\text{Nonlinear}} = 0.161$), whereas a significant nonlinear association was observed among patients aged ≥ 55 years ($P_{\text{Total}} = 0.011$; $P_{\text{Nonlinear}} = 0.027$). Among men, RC was significantly and linearly associated with MACCE risk ($P_{\text{Total}} = 0.037$; $P_{\text{Nonlinear}} = 0.232$). Among women, the overall association did not reach statistical significance ($P_{\text{Total}} = 0.052$), although evidence of nonlinearity was observed ($P_{\text{Nonlinear}} = 0.022$). Sensitivity analyses showed that the positive nonlinear association between RC and MACCE remained robust in patients with hypertension and in those with non-ST-segment elevation myocardial infarction. **Conclusions:** RC levels were significantly and nonlinearly associated with the risk of MACCE after PCI in patients with AMI, with evidence of heterogeneity across age and sex subgroups. Routine monitoring of RC may help identify residual cardiovascular risk and refine secondary prevention strategies in this population.

Keywords

Remnant Cholesterol, Acute Myocardial Infarction, Major Adverse Cardiovascular and Cerebrovascular Events, Restricted Cubic Spline