**LDL-C level and long-term all-cause mortality after coronary revascularization: Restricted cubic splines method**

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**Abstract**

Although high LDL-C is a valuable indicator of adverse cardiovascular outcome, the associations of LDL-C with long term mortality in patients who undergo coronary artery bypass graft (CABG) surgery is still up-in-the-air.

Tehran heart center (THC) CABG database registry was lunched in 2004. All data recorded prospectively at the time of admission. In this study, we included all patients who underwent isolated CABG procedure. All patients with lack of data and missing LDL were excluded from the analysis. Conclusively, a total of 17,555 patients with adequate data (all variables included had lower than 5% missing) entered the final analysis. The median follow-up was76.78 months [75.87- 77.69], which calculated through “reverse Kaplan-Meier” method. To reveal the relationship between LDL-C and mortality, **restricted cubic spline** method was applied. We used the “dfmacox” (degrees of freedom in multivariate additive Cox models) function in smoothHR based on corrected Akaike information criterion (AIC) to obtain the optimal number of degrees of freedom in the extended Cox-type additive multivariate analysis [1]. The reference value was defined as lowest risk point. Performance of LDL-C level was plotted by mortality status using adjusted multivariable hazard ratios (HR) and 95% confidence intervals (CI) in each gender [2]. We examined proportional hazards assumption by visual inspection of residuals plots on time and using the Schoenfeld residuals test. Statistical significance was set as “P < 0.05” in a two-tailed test. All statistical analyses were performed using R version 4.1.0 (R Foundation).

Mortality in both men and women population revealed a nonlinear relation (“U-shaped”) with LDL-C levels. In males (12,778. 72.8%) lowest risk of mortality was at 108 mg/dl (p for non-linearity<0.001, df=3), although in females (4,777. 27.2%) lowest risk of mortality was at 103 mg/dl (p for non-linearity<0.001, df=3).

According to our results, while the LDL-C level is a prognostic factor, it should not be implied that patients with a very low LDL-C have a necessarily better outcome after CABG.

In conclusion, the U-shaped association was detected between LDL-C level and mortality among patients who underwent isolated CABG procedure. Hence, personalized risk stratification should be performed regardless of baseline LDL levels.

**Keywords:** LDL, CABG, U-shaped, RCS, Restricted Cubic Splines, Prognostic Impact

**References**

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