Absence of LDL-C measurement after an Atherosclerotic Cardiovascular Disease (ASCVD) event is associated with a higher incidence of a subsequent Major Adverse Clinical Event (MACE)-Real world experience in a large integrated healthcare system: The IMPRES Study

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BACKGROUND

There has been considerable discussion regarding the value of follow up LDL-C measurements after initiation of statin therapy for secondary prevention. We therefore set out to determine in a large integrated healthcare system whether measurement of LDL-C after an atherosclerotic cardiovascular disease (ASCVD) event was associated with a difference in major adverse cardiac events (MACE) during follow-up.

METHODS

Intermountain Healthcare patients who were ≥18 years of age, had an ASCVD diagnosis of coronary artery disease (CAD), cerebrovascular disease (CVD), or peripheral artery disease (PAD) between January 1, 1999 and December 31, 2013, who survived the index ASCVD event, and had ≥3 years of follow-up were studied. Patient demographics, history, prescribed medications, and whether an LDL-C was measured were analyzed.

RESULTS

- A total of 62,070 patients met study criteria (CAD: 69.3%, CVD: 18.6%, and PAD: 12.1%).
- 31,184 (50.2%) did not have and 30,886 (49.8%) did have a follow-up LDL-C test prior to a subsequent MACE (death, MI, CVA, and revascularization) or before the end of follow-up. The highest percentage of patients without measurement of LDL were those with PAD (Figure 1).
- Baseline characteristics stratified by follow-up LDL-C are shown in the Table.
- Long-term MACE occurred in 18,884 (60.6%) vs. 14,967 (48.5%) of those without vs. with an LDL-C measurement, respectively over the course of the study. Kaplan-Meier survival curves are shown in Figure 2.
- MACE at three years shows highly significant differences overall and based on each index event (Figures 2 and 3).
- Overall and all individual components of MACE are significantly different based on measurement of LDL-C (Figure 4).
- The multivariable, long-term hazard ratios for MACE based on measuring an LDL-C were 0.46, 0.33, and 0.60 at 1 year, 3 years, and long-term, respectively.
- A statin was prescribed to 72.4% of all patients during follow-up. Frequencies of 3-year overall MACE and its individual components with respect to statin therapy and LDL-C measurement are shown in Figure 5. Statin therapy without measurement of LDL-C did not lower overall MACE to the level of those with measurement of LDL-C.

	No follow-up LDL-C (n=31,184)	Follow-up LDL-C (n=30,886)	p-value
Age (years)	66.8±14.6	65.0±12.5	<0.0001
Sex (male)	19,690 (63.1%)	20,465 (66.3%)	<0.0001
Hypertension	20,487 (65.7%)	21,777 (70.5%)	<0.0001
Hyperlipidemia	15,849 (50.8%)	20,766 (67.2%)	<0.0001
Diabetes	8,473 (27.2%)	9,041 (29.3%)	<0.0001
Smoking	11,240 (36.0%)	10,415 (33.7%)	<0.0001
Renal failure	2,586 (8.3%)	1,919 (6.2%)	<0.0001
Heart failure	5,558 (17.8%)	4,338 (14.0%)	<0.0001
History of cancer	2,999 (9.6%)	3,474 (11.2%)	<0.0001
BMI (kg/m²), n=57,269	28.4±6.0 (median: 27.6)	29.3±5.9 (median: 28.5)	<0.0001
Prior statin use	3,409 (10.9%)	5,375 (17.4%)	<0.0001

FIGURE 1: Percentage of Patients overall and in each subpopulation that did not have LDL-C measured

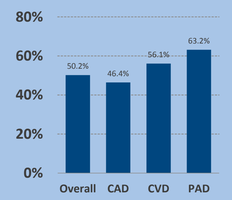


Figure 2: Event free survival based on those in whom LDL-C was measured post index event

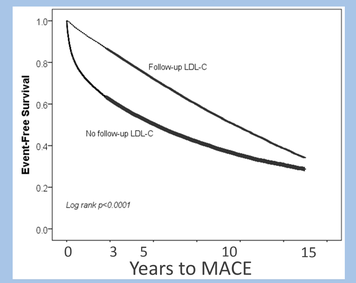


FIGURE 3: Three year MACE based on index event

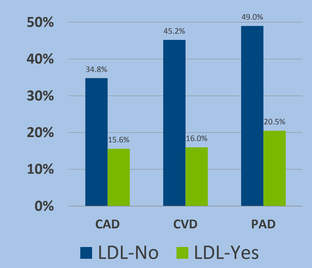


FIGURE 4: Three year MACE and individual components

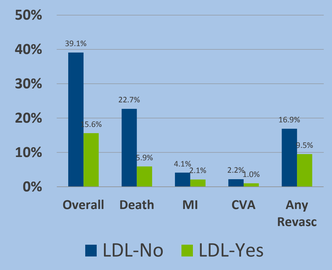
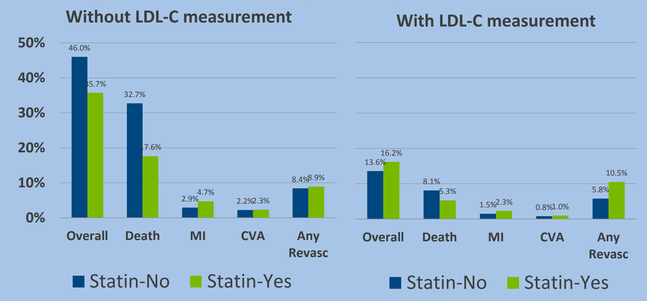


FIGURE 5: Three year MACE by statin use



CONCLUSIONS

These data indicate that there is a significant and clinically meaningful difference in MACE based on a follow-up measurement of LDL-C. While these results are limited in that they are from a retrospective registry, they suggest that measurement of an LDL-C after an initial ASCVD event is part of a management strategy that is associated with a decrease in MACE, particularly death. Even though there is a significant benefit associated with measurement of LDL-C in all populations of ASCVD (CAD, CVD, PVD), a higher percentage of patients with CVD and PVD do not have measurements of LDL-C. Administration of statin therapy without measurement of LDL-C did not lower overall MACE to the levels observed in patients for whom LDL-C was measured.

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