Treatment Gap of Statin Therapy in Patients Hospitalized with a New Diagnosis of Atherosclerotic Cardiovascular Disease Within a Large Healthcare Institution

THE IMPRES STUDY

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BACKGROUND

Statins have been shown to be effective at reducing the risk of major cardiovascular events (MACE) in patients with atherosclerotic cardiovascular disease (ASCVD), which include coronary artery disease (CAD), cerebrovascular disease (CVD), and peripheral artery disease (PAD).

Guidelines recommend that all patients with ASCVD should be prescribed a statin regardless of LDL-C levels.

However, data from the National Health and Nutrition Examination Survey show CVD and PAD patients are undertreated relative to CAD patients:

- CAD: 73.9%
- CVD: 51.4%
- PAD: 18.3%

Given the tendency to homogenize ASCVD patients when investigating the impact of statin therapy, we sought to quantify the treatment gap between ASCVD groups and assess the impact of under treatment on MACE incidence.

METHODS

Study objectives: 1. Determine the frequency of statin prescriptions immediately following an ASCVD diagnosis; 2. Determine differences in statin prescription frequencies among the ASCVD diagnoses of CAD, CVD, and PAD; and 3. Determine if receiving a statin is associated with a reduction in long-term MACE risk.

Study population: The IMPRES Study evaluated Intermountain Healthcare patients diagnosed with ASCVD between January 1, 1999 and December 31, 2013. To be included patients had to be ≥18 years old, have 3 years of follow-up, minimum of 2 encounters in the delivery system at least 12 months apart, survived index hospitalization, and documented ASCVD diagnosis:

- CAD: primary inpatient CAD or MI diagnosis, or documented PCI or CABG
- CVD: primary inpatient ischemic stroke diagnosis or documented carotid endarterectomy or stenting
- PAD: primary inpatient PAD diagnosis, documented aortic aneurysm repair or peripheral arterial revascularization (bypass or percutaneous intervention)

Baseline and clinical characteristics were collected at the time of ASCVD diagnosis.

Statin use was defined as receiving a statin prescription if it occurred at discharge, within 30 days of discharge if statin naïve, or within 90 days if receiving statin therapy prior to ASCVD event.

MACE was defined as the occurrence of all-cause death, myocardial infarction, stroke, or follow-up revascularization. Revascularization was defined as a PCI or CABG occurring ≥60 days post-ASCVD event, aortic repair, carotid endarterectomy or stent, and peripheral stent or bypass.

Multivariable Cox proportional hazards regression analysis was used to determine the association of a statin prescription at discharge to MACE (mean follow-up: 6.4±4.7 years).

RESULTS

A total of 62,070 patients met study criteria, with 43,046 (69.4%) being diagnosed with CAD, 11,541 (18.6%) with CVD, and 7,483 (12.0%) with PAD.

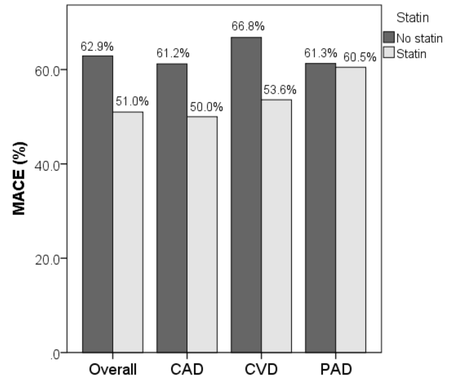
Baseline characteristics are shown in the Table stratified by ASCVD diagnosis.

	Total, n=62,070	CAD, n=43,046	CVD, n=11,541	PAD, n=7,483	p-value
Demographics					
Age (years), mean±SD	65.9±13.7	65.4±12.4	70.1±14.6	62.0±17.2	<0.0001
Sex, n (% male)	40,155 (64.7%)	30,417 (70.7%)	5,520 (47.8%)	4,218 (56.4%)	<0.0001
Race, n (% white)	55,566 (89.5%)	38,652 (89.8%)	10,423 (90.3%)	6,491 (86.7%)	<0.0001
Insurance status, n (%)					
Private	22,383 (36.1%)	17,037 (39.6%)	2,725 (23.6%)	2,621 (35.1%)	<0.0001
Medicare/Medicaid	36,775 (59.2%)	23,966 (55.7%)	8,302 (71.9%)	4,507 (60.2%)	
Self-pay	2,912 (4.7%)	2,043 (4.7%)	514 (4.5%)	355 (4.7%)	
Traditional CV risk factors, n (%)					
Hypertension	42,264 (68.1%)	28,678 (66.6%)	8,839 (76.6%)	4,747 (63.4%)	<0.0001
Hyperlipidemia	36,615 (59.0%)	27,154 (63.1%)	6,568 (56.9%)	2,893 (38.7%)	<0.0001
Diabetes	17,514 (28.2%)	12,349 (28.7%)	3,289 (28.5%)	1,876 (25.1%)	<0.0001
Smoking	21,655 (34.9%)	15,131 (35.2%)	3,395 (29.4%)	3,129 (41.8%)	<0.0001
Renal insufficiency	4,505 (7.3%)	2,520 (5.9%)	725 (6.3%)	1,260 (16.8%)	<0.0001
BMI categories (kg/m^2), n (%)					
<25	14,821 (25.9%)	8,848 (21.9%)	3,540 (34.0%)	2,433 (37.3%)	<0.0001
25-29.9	21,471 (37.5%)	15,586 (38.6%)	3,651 (35.1%)	2,234 (34.3%)	
≥30	20,977 (36.6%)	15,910 (39.4%)	3,213 (30.9%)	1,854 (28.4%)	
Prior diagnoses, n (%)					
Heart failure	9,896 (15.9%)	7,198 (16.7%)	1,672 (14.5%)	1,026 (13.7%)	<0.0001
Malignancy	6,473 (10.4%)	4,138 (9.6%)	1,513 (13.1%)	822 (11.0%)	<0.0001
Depression	6,719 (10.8%)	3,920 (9.1%)	1,846 (16.0%)	953 (12.7%)	<0.0001
Atrial fibrillation	10,169 (16.4%)	6,964 (16.2%)	2,337 (20.2%)	868 (11.6%)	<0.0001
COPD	3,739 (8.7%)	3,739 (8.7%)	1,092 (9.5%)	1,115 (14.9%)	<0.0001
Obstructive sleep apnea	7,970 (12.8%)	5,293 (12.3%)	1,866 (16.2%)	811 (10.8%)	<0.0001
Concomitant medications taken 1 year prior to index ASCVD event, n (%)					
Statin	4,955/37,231 (13.3%)	3,369/24,420 (13.8%)	860/7,152 (8.3%)	726/5,659 (10.1%)	<0.0001
Non-statin lipid lowering	1,267/37,231 (3.4%)	774/24,420 (3.2%)	295/7,152 (4.1%)	198/5,659 (3.5%)	<0.0001
Warfarin	1,501/37,231 (4.0%)	753/24,420 (3.1%)	388/7,152 (5.4%)	360/5,659 (6.4%)	<0.0001
ACE inhibitor	5,091/37,231 (13.7%)	3,130/24,420 (12.8%)	1,128/7,152 (15.8%)	833/5,659 (14.7%)	<0.0001
ARB	2,442/37,231 (6.6%)	1,572/24,420 (6.4%)	511/7,152 (7.1%)	359/5,659 (6.3%)	<0.08
Beta blocker	5,537/37,231 (14.9%)	3,744/24,420 (15.3%)	929/7,152 (13.0%)	864/5,659 (15.3%)	<0.0001
Calcium channel blocker	3,529/37,231 (9.5%)	2,051/24,420 (8.4%)	795/7,152 (11.1%)	683/5,659 (12.1%)	<0.0001
LDL-C (mg/dL), mean±SD					
LDL-C within 1 year prior to index ASCVD event	109.9±38.5, n=13,455	111.1±38.5, n=9,553	107.9±37.8, n=2,294	105.6±39.2, n=1,608	<0.0001
LDL-C at ASCVD event	101.4±36.0, n=35,186	100.9±36.5, n=27,553	104.9±36.3, n=6,606	94.7±35.6, n=1,027	<0.0001

There was a substantial difference in those receiving a statin prescription at discharge (*p<0.0001*):

- CAD: 82.5% (35,529)
- CVD: 53.1% (11,541)
- PAD: 27.8% (2,078)

Frequency of MACE overall and by ASCVD group stratified by receiving statin therapy or none at discharge. Comparisons: overall: p<0.0001; CAD: p<0.0001; CVD: p<0.0001; PAD: p=0.56.



Statin prescription immediately following ASCVD diagnosis was associated with a reduced risk of long-term MACE among each ASCVD group: CAD: adjusted HR=0.95, p=0.003; CVD: adjusted HR=0.95, p=0.04; PAD: adjusted HR=0.90, p=0.006.

Among PAD patients, there was a significant interaction between receiving a statin at discharge and age (p-interaction <0.0001), with older patients less likely to receive a statin.

After adjustment by risk factors, statin use at discharge continued to be significantly associated with a reduced risk of long-term MACE for those ≥65 (HR=0.83, p<0.0001), with no significant association seen among those <65 (HR=1.09, p=0.17).

CONCLUSIONS

A substantial treatment gap for statin use was found amongst the different ASCVD diagnosis groups.

Given the exigent need to increase statin use in these subgroups, as evidenced by a significant treatment gap and improved outcomes with statin use, efforts aimed at increasing statin use following ASCVD diagnosis, especially for CVD and PAD patients, should be a high priority.

No Conflicts of interest to disclose; Study was funded by a research grant from the Medicines Company.